ERIC Document Resume	See Instruction Sheet	DATE OF RESUME 6/11/65	DATE RECEIVED

A. PUBLICATION DATA

1. ERIC NUMBER ED000767
2. ORIGINATOR CONTROL NO(S). 8211
3. IDENTIFICATION NO.

4. AUTHOR(S): Dreher, Robert E. and Beatty, Walcott H.

5. TITLE OF DOCUMENT ABSTRACTED: Instructional Television Research, Project Number One: An Experimental Study of College Instruction Using Broadcast Television

6. PUBLICATION TITLE: N.A.

7. EDITOR(S): N.A.

8. PLACE OF ORIGIN
ORG. San Francisco State College
ST. San Francisco,
CITY, ST. California
TELE. EXT.
INST/LOC CODE

9. PUBLISHER OR SOURCE San Francisco State College

10. VOL.	11. PAGES	12. MO./YR.	13. TOTAL PP.
N.A.	N.A.	Apr. 58	66

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TYPE OF REPORT
PROPOSAL ☐
IN-PROGRESS ☐
FINAL ☒
FOLLOW-UP ☐

OTHER ERIC REFERENCES:

ERIC SATELLITE CODE

B. INDEXING DATA

14. SUBJECT AREA

15. TYPE OF ENDEAVOR experimental study

16. INDEXING TERMS (6-12)

experimental studies	educational TV		
general education	audio-visual aids		
teaching methods	teaching aids		

17. ABSTRACT (MAX. 250 WORDS)

A project sponsored by the Fund for the Advancement of Education which explores the feasibility of presenting general education courses to regular college students using the medium of broadcast television. Three contrast groups were compared in each of three freshman courses. The groups consisted of students taking the course as normally presented on the campus (control group), students viewing the experimental telecourse in their own homes, and students viewing the experimental telecourse in a campus classroom. Each of the telecourses represented an adaptation of the regular campus class and students taking the telecourses watched two weekly television broadcasts and also had regularly scheduled discussion and quiz sections on the campus.

ERIC No.

18. SOURCE OF ABSTRACT

C. FUNDING DATA

19. SUPPORTING ORGANIZATION

20. DIVISION OR DEPT.

21. CONTRACT NO.

PROJECT NO.

22. TOTAL COST OF PROJECT

23. DURATION OR PROJECT

U.S. Department of Health, Education, and Welfare
Office of Education

ERIC Form 1

#~~8~~ R-6-~~8~~ 23.

8211

~~X-23~~ [illegible] (on loan)

Instructional Television Research

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PROJECT NUMBER ONE:

An Experimental Study of College Instruction Using Broadcast Television

SAN FRANCISCO STATE COLLEGE

Project Sponsored by
The Fund for the Advancement of Education

ED000767

Instructional Television Research

PROJECT NUMBER ONE

An Experimental Study of College Instruction Using Broadcast Television

Robert E. Dreher
Walcott H. Beatty

Project Sponsored by
The Fund for the Advancement of Education

Project Conducted by
SAN FRANCISCO STATE COLLEGE

Through the Facilities of
Station KQED, Channel 9

San Francisco, California
April, 1958

DOLORES PRESS, S. F.

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Executive Director — Lyle M. Nelson; Willard Leeds
Project Evaluator — Walcott Beatty
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- **Psychology 10.1** — Shepard Insel
  Discussion leader: Morton Keston
- **Social Science 30** — Thomas P. Lantos
  Discussion leader: A. Walter Olson
- **English 6.1** — John L. Clark
  Discussion leader: Albert T. Anderson
- **Creative Arts 10** — Mayo Bryce, art
  Jules Irving, drama
  John Tegnell, music
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Production Director — David Parker
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Staff Artist — Selma Burgess
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English 6.1 — Eugene Warren
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Staff of Station KQED:
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Program Director — Jon Rice
Production Manager — Gerald Marens
Chief Engineer and Technical Director — Robert Nissen

Objectives and General Conclusions

The overall purpose of this study has been to explore the feasibility of presenting four General Education courses to regular college students using the medium of broadcast television. Three contrast groups have been compared in each course: 1) students taking the course as it is normally presented on the campus (Control group), 2) students viewing the experimental telecourse in their own homes (At-Home TV group), and 3) students viewing the experimental telecourse in a campus classroom (On-Campus TV group). Each of the telecourses represented an adaptation of the regular campus class for television presentation. Students taking the telecourses watched two weekly television broadcasts and also had regularly scheduled discussion and quiz sections on the campus. Three freshman courses (Psychology, Basic Communication, and Creative Arts) and one sophomore course (Economics) were studied. The broad objectives of this project with the findings relevant to each follow:

Objective One: To compare the three contrast groups in each course on the basis of achievement in the course.

Relevant Findings:

(a) The three modes of course presentation were equally effective in bringing about increases in knowledge of course content, as measured by academic achievement examinations.

(b) There were no significant differences in the instructors' grades assigned to the three groups in any of the courses.

Objective Two: To evaluate the attainment by the contrast groups in each course of certain broader educational goals related to the General Education Program of the College.

Relevant Findings:

(a) The groups in each course were compared on instruments designed to measure varying degrees of self-insight, self-acceptance, and the perceived self-acceptance of others. No significant patterns associated with manner of course presentation emerged from these comparisons.

(b) Sociometric data showed that in all courses the highest percentages of class members known were found in the regular campus classes (Control groups). While there was some evidence to suggest an "isolation effect" in the At-Home TV groups, this held up statistically only in the Psychology course.

Objective Three: To investigate a number of student characteristics which might be related to differential success in the three contrast groups. These were: previous grade point average, college aptitude, auding (listening) ability, and "need to achieve."

Relevant Findings: Clearly, on a basis of these analyses, no identifiable type of student emerged as profiting more from television instruction than classroom instruction. Although both **high** and **low** ability students in the television groups of the Psychology course out-performed their counterparts in the Control Group, in none of the other courses and on none of the other variables did comparable differences among contrast groups occur.

Objective Four: To determine student attitudes toward telecourses especially adapted for the broadcast television medium.

Relevant Findings:

a) At the end of each course, students indicated their preferences for the three types of course presentation used in this study. There was an overwhelming preference for regular campus classes.

(b) Although it had been most difficult to recruit students for participation in the At-Home TV groups, the most favorable attitudes toward telecourses were shown by students taking the courses at home. Students in the On-Campus TV groups tended to dislike and to be critical of this type of course reception. Students in the Control groups, without experience in the telecourses, tended to be negative toward them.

Objective Five: To survey the performance level of groups (other than regular college students) who took the courses by television, without regular discussion periods on the campus.

Relevant Findings:

(a) A group of high-ability high school seniors performed as well as the college groups in the Psychology course. Their course consisted of watching the television broadcasts and having discussion sessions with qualified teachers from the high school staffs.

(b) Persons in the general public were permitted to enroll for college credit in Psychology, Economics and Basic Communication through the College Extension Division. While approximately 40% of these students withdrew from or received grades of "incomplete" for these courses, all of those who completed the courses received grades of "C" or above.

(c) Selected groups of prisoners at San Quentin Prison took the Psychology, Economics, and Basic Communication courses solely by television, through the Extension Division. Those who completed the courses performed at the "C" grade level or above.

Objective Six: To determine professors' reactions to their teaching assignments in this study.

Relevant Findings:

(a) While the professors teaching the telecourses found certain stimulating aspects to adapting and presenting their courses for television broadcasts, they found their assignments generally much more taxing than a regular course load, and in some ways less rewarding.

(b) The professors felt that one-half release time for **preparing** a telecourse (the semester prior to its presentation) and one-quarter release time during the **teaching** semester were not adequate.

(c) Professors (other than the telecourse professors) who acted as discussion leaders for the On-Campus TV groups **disliked** their assignments with varying degrees of intensity.

Objective Seven: To describe some of the practical problems an institution encounters in presenting broadcast telecourses to regular college students.

Relevant Findings:

(a) If telecourses are to become part of the regular college program, there are both administrative and advising policies a college must determine to handle student resistance to taking telecourses and scheduling to accommodate both regular classes on the campus and telecourses taken at home.

(b) It is apparent that policy decisions must be reached concerning the course load of professors teaching telecourses.

(c) As regards the actual production of the courses on an educational television station, many of the production details were handled by student crews working for credit in courses in the Television Department. This direct experience with the production of television broadcasts was deemed an invaluable asset to the training of students for work in television.

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J. PAUL LEONARD

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PART ONE

I. Setting of the Present Study

San Francisco State College

Because the nature of an institution is so important a determinant of the sort of action research conducted within it, a description of the general background for this study is deemed essential. There is no intention here to present a history of the college. Rather, the purpose of these paragraphs is to describe as succinctly and accurately as possible some of the important characteristics of San Francisco State College as a living, dynamic institution.

It is simpler to describe a person physically than psychologically, and so it is with the College. By fall semester, 1954, San Francisco State had abandoned its cramped, block-square, old campus located near the heart of San Francisco and was installed on its present campus which is located on ninety-four acres in the southwest corner of the city. To the casual daytime visitor, it is an attractive, busy, modern campus with a feeling of spaciousness, as city campuses go. To those who know the campus, it is a beehive of activity fourteen hours a day. Like many urban colleges, there is a heavy late-afternoon and evening program, so present facilities are in almost constant use from eight in the morning until ten at night.

Just ten years before this study began, the total enrollment at San Francisco State was 2,498 students. For the fall semester, 1956, there were 9,017 students at the College and 302 full-time and 149 part-time faculty members.

The Student Body

Any institution in which effective undergraduate instruction is the primary mission has an orientation which has come to be known as student-centered. Historically, the individual student and his needs have been important at San Francisco State College, and they are today. In fact, the College has done some rather unusual, if not unique, things in the interests of its students.

Shortly after World War II, the faculty at the College subjected itself, the students, and the curriculum, to one of the most intensive soul-searchings on record. The purpose of these activities was to arrive at a basic philosophy of general education, to determine the needs of San Francisco State students, and to develop a general education curriculum to meet these needs. Not content to plan a program for a generalized, hypothetical student body, the College executed a "Student Needs Study" during the academic year, 1946-47 (5). The results of this study, reported in detail elsewhere (3, 5), provided an unusually complete picture of the student body at that time and played an important role in the faculty considerations for making curriculum revisions.

Whether the needs of today's students are the same as those of students ten years ago is a moot question. In certain ways, however, the two groups share a number of common characteristics:

1. The majority of students (particularly in the freshman and sophomore classes) live at home and commute to the campus from cities throughout the San Francisco Bay Area. Although money has been appropriated to build student dormitories on the campus, there is at present only temporary, barracks-type housing which accommodates a very limited number of students. It consists of one residence hall for forty freshman men and seventy-two unfurnished apartments for married veterans.
2. A high percentage of today's students carry full or part-time jobs, indicating, as was true ten years ago, a lower socio-economic background for this group than is frequently presumed for college students. A perennial advising problem lies in discouraging students from overloading with outside work and/or classes.
3. As regards personal and family adjustment, an area carefully explored in the Student Need Study, it is difficult to evaluate today's student group. However, the loneliness or lack of group identification found among the majority of students ten years ago appears to be a persistent problem. A recent survey of opportunities for peer contacts among our students showed that classes rather than outside social events or campus activities serve this important function for the majority of students. This is not a surprising finding, of course, in the light of the work-study-class-commute schedules of many of our students.

The General Education Program

Working within the broad definition of general education as "non-specialized, non-technical education which should be the common possession of all persons to enable them to function effectively in a democratic society," the faculty at San Francisco State College developed a 45-unit program required of all students entering the College as freshmen. (See Appendix A.) With the exception of one two-unit course normally taken during the junior year, students complete their "G.E." requirements by the end of the sophomore year and are ready to move into majors and specialized programs at the upper division level.

While the 45 units represent the bare bones of the program at the College — the end result of a tremendous amount of thinking and planning — they do not do justice to the conceptual flavor of the total program. Even with the hazards of selection and capsulating, let us enumerate briefly some of the major concepts — both philosophical and practical — which characterize the General Education Program:

1. Underlying and determining the entire program were four basic "area needs" identified by the faculty. These were: individual development, home and family living, social and civic responsibilities, and vocational orientation.

2. No course in the program is an introductory or first course in a traditional subject-matter field. Rather, the courses are especially designed to serve one or more of the four area needs above, frequently through an interdisciplinary approach. Furthermore, no G.E. course is applicable toward a major.

3. Proper functioning of the program is predicated upon the social experience provided in small, democratically organized classes. "The unique feature of these classes is that much of what is usually thought of as extracurricular is included in active school time. Fun becomes part of the program. Automatically, each student belongs to a group." And, "the emphasis is on a dynamic, living world rather than a static textbook world and upon 'doing' rather than 'talking'." (3, pp. 39-40).

4. The high level of faculty involvement in the General Education Program which led to its development persists today by virtue of the fact that all G.E. offerings are taught by regular faculty members, not a special G.E. staff. A standing faculty committee, known as the General Education Committee, maintains a constant surveillance over and review of the total program.

5. Finally, the program has specified certain desired behavioral goals — changes in student behavior which the G.E. experience should bring about. These goals are both ambitious and long-range, with the emphasis, by definition, upon effective functioning in a democratic society. They are not campus-bound. Students attaining these goals cannot become arrested at an undergraduate orientation to the world.

For those interested in a fuller discussion of the rationale and practical functioning of the General Education Program, the references at the end of this chapter provide a number of excellent sources. (1, 2, 4, 6).

Faculty Attitudes Toward Instructional Television

Despite its present size, San Francisco State College resembles many smaller liberal arts colleges in the emphasis it places upon teaching. Qualified applicants for faculty positions are selected primarily for their interest and experience in college teaching; and their retention on the staff is importantly determined by their effectiveness as teachers. In this setting, the announcement in February, 1956, that four General Education courses were to be offered experimentally by television produced considerable faculty reaction.

Two independent surveys of faculty attitudes toward instructional television were conducted on the campus after the initiation of the present project. The first of these was an interview survey of faculty opinions concerning the use of television for systematic college instruction in general. It was conducted during the spring of 1956 by students in a course in "Public Opinion and Propaganda" taught by Dr. Frederic W. Terrien of the Social Science Division. The second survey, conducted during the fall semester, 1957, was more specific to the present study and consisted of a number of questions which comprised part of a faculty questionnaire submitted to all faculty members for completion prior to the annual faculty conference in December, 1957. Brief summaries of these surveys seem pertinent here.

The student survey[1] was based upon a series of open-ended questions which were presented to 62 faculty members (a sample representing approximately 15.5% of the total faculty). Analysis of the responses led to the following conclusions:

> "1. There is a general lack of knowledge on the part of the faculty about the use of television as an educational medium. This lack of knowledge, however, does not indicate a lack of interest in its possibilities for the future both as an educational medium, and as a partial aid to alleviate the problem of increasing enrollment demand.
>
> 2. Open circuit television is favored (33.34%) by the faculty on the basis that it would give the general public an opportunity for higher education.
>
> 3. The faculty's reaction to the type of student to whom television will appeal seems to favor the better qualified, highly motivated, experimentally-minded individual (16.67%) rather than the passive or low calibre student.
>
> 4. Most instructors do not favor becoming an instructor for a television course on the basis of lack of teacher-student interaction and the necessary techniques of television instruction one must use in the presentation of subject matter.
>
> 5. The lecture, non-discussion type of course can be most profitably taught via television. However, pervading the whole attitude of the faculty is the importance of teacher-student contact which should be effected somewhere during the course.
>
> 6. Education by television will not adversely affect appropriations for new plant (23%) since the need for support in *both* fields will be recognized.
>
> 7. Student feeling was not a primary factor in considering television education. Student attitudes would be indifferent, except in special cases, such as the limited or handicapped student."

The results of the second faculty survey are based upon the responses made to a series of items about the Television Research Project by 200 faculty members (approximately two-thirds of the teaching faculty holding full-time appointments that year). Respondents did not identify themselves, nor their divisions, when completing the questionnaire. The following summary of the results was prepared by the Office of Curriculum Evaluation at the College:

> "*The TV-Experiment.* During recent months, a number of faculty members have declared in campus discussions that there should have been more consultation with the faculty before our college applied for foundation funds for the TV-Experiment. 47% of the faculty indicated agreement with this comment, and 25.5% indicated disagreement with it
>
> Another comment heard on campus is that the TV-Experiment is not a real experiment but only a way to open the door to permit more and more courses to be given through TV at our college. 21% indicated agreement with this comment; 43.5% said they disagreed; and 32% said they could make no judgment about it.
>
> Questionnaire responses indicated that the faculty are not overwhelmingly for or against the use of TV in teaching. Only 6.5% agreed with the view that all possible effort should be exerted to prevent its further use on our campus. Likewise, only 3.5% said that while they were against it, it's here to stay and there was no point struggling against the inevitable

---

[1] The students were: Joel Robert Cannon, who originated and directed the entire project; Corinne West, who participated extensively in the organization and analysis of the results; and nine others who conducted the bulk of the interviews: R. L. Blumenthal, D. L. Cronin, L. H. Downs, S. K. Garner, M. K. Hans, R. A. Hanson, S. M. Roth, E. A. Sweeny, and M. D. Storman.

Most of the faculty (84.5%) subscribed to the view 'TV in teaching is probably good for some things and probably not good for other things. We ought to direct our efforts to insuring its use only where it seems advantageous for the kind of learning we want to see taking place.' However, 42% said they agreed with a statement which, while it does not oppose the one just quoted, is more strongly favorable: 'TV is probably an excellent medium for education. Strong efforts should be made to investigate its potentialities for college and university teaching.'

When asked about the effect of TV on teaching during the next five or ten years, 2% of the faculty said they saw this effect as dangerous to them personally, 13% saw it as a danger to American education, 19.5% saw it as a means of improving college instruction, 15.5% saw this effect as neither good nor bad, and 33% said they had no judgment in this matter. 17% did not respond to the item.

Since the question of instructor-student interaction is so relevant to the problem of TV in teaching, the faculty was asked whether they had been aware (before the TV-Experiment presentation at the November 15 faculty meeting) that *no* course in the TV experimental setup is given entirely via TV but always includes discussion periods on campus. (Students taking the courses for reduced credit through extension are not part of the experimental design.) 35.5% of the faculty said they had *not* been aware of this feature in the TV-Experiment; but 55% said they thought that one student group, taking a course *exclusively* through TV, should have been included in the experimental design.

The view has been expressed on campus that no matter how excellent the experimental design, it is impossible to determine objectively whether teaching by TV is superior or inferior to teaching by normal means in any given course. 23% of the faculty agreed with the view, and 42.5% disagreed

Contrary opinions have been expressed on campus with respect to the question as to whether, in view of the nature and goals of G.E. TV is probably better for G.E. courses than for courses in the specialized programs. 28.5% of the faculty agree that this is so, and 41% said they did not agree

Finally, the subcommittee preparing the questionnaire items wished to assure itself that the items on the controversial TV question were, as a whole group, not favoring one side or the other. The item elicited the hoped-for response, as only 14% thought the items as a whole pro-TV and only 5% thought they were anti-TV."

Summary

A little over ten years ago, the faculty at San Francisco State College, then a small institution, undertook the development of a General Education Program tailored to the particular needs of the urban, commuting students it served. Today, with a student enrollment more than three times that of a decade ago, many faculty members are needed to teach General Education classes of small size. Since instructional television appears to be economically feasible only for multiple-sectioned courses, four of the College's General Education courses were selected for the present study. In the thinking of many faculty members, this threw into sharp focus the possibility that television presentation would depersonalize courses which were originally planned to foster both student-professor and peer contacts.

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II. The San Francisco State College Television Research Project

Background

The person directly responsible for initiating the present project was Dr. J. Paul Leonard, then President of San Francisco State College. Like other college administrators, he faced the two serious problems of an impending faculty shortage and a physical plant incapable of expanding rapidly enough to keep pace with mounting enrollments. In seeking means by which the College might cope with both of these difficulties, he was challenged by the possibilities of instructional television. Serving as President of the Board for the Bay Area Television Association, the governing body for San Francisco's Educational Television Station KQED, Dr. Leonard believed that broadcast instructional television provided a potential solution for both faculty and classroom shortages. Closed-circuit television instruction, on the other hand, appeared to him to solve only staffing problems by increasing the number of students one professor could teach.

For several years, a variety of telecourses offering college credit had been presented on educational television stations located on university campuses. The students in such courses were primarily persons from the general public rather than regular college students. Informal reports about the content of such courses, the problems of teaching by television, the numbers enrolling for credit, and student reactions (largely favorable) had begun to appear (3, 4, 7, 12). In addition, several universities had installed closed-circuit television equipment to carry the voice and image of a professor lecturing into the system to a series of television receiving classrooms. Early experimental studies of the performance of students receiving instruction by closed-circuit television showed that it did not differ significantly from that of students taught in the conventional classroom manner (2, 9). The Armed Services had conducted several studies comparing broadcast telecourses, closed-circuit television teaching, and kinescopes (motion pictures made of television lectures for subsequent use as "training films") with traditional military lecture presentations (5, 6, 8, 10, 11). Again, the telecourses compared favorably with conventional methods of instruction.

There are three publications which summarize well the research evidence available on instructional television at the time this project was initiated. The first of these is *The American Psychologist* (1) for October, 1955, which was devoted to the status of systematic college instruction using television. There was much anecdotal and informal material but extremely limited research about the use of television for regular college instruction. The second reference, the report of Project Number One at the Pennsylvania State University (2), is mentioned here not only for its research findings but also for the very complete discussion in Chapter I of the philosophical and practical problems associated with such research. Finally, for an excellent summary of instructional television research completed through 1956, the reader is referred to the inventory prepared by Kumata (9).

Research Proposal to the Fund for the Advancement of Education

After more than a year of deliberation and planning, a faculty committee working with the President drew up a *Prospectus for the Experimental Study of Educational Television at San Francisco State College* which was submitted to the Fund for the Advancement of Education on December 1, 1955. Since the broad outlines of the present study were contained in the *Prospectus* and a research grant was made to the College in February, 1956, on the basis of its contents, this document is presented in Appendix B.

The proposal focused upon a comparison of the performance of groups of *regular college students* enrolled in *especially prepared broadcast telecourses* to be viewed by the students *in their own homes* with the performance of students taking the courses as normally presented on the campus. It proposed, further, an investigation of student characteristics related to success (or failure) in such telecourses and a determination of student attitudes toward television instruction. It also sought to investigate the major problems a college faces in presenting instruction by broadcast television; specifically, in terms of the faculty members assigned to television teaching and, more broadly, in terms of institutional planning.

The Planning Semester, Spring, 1956

With the awarding of the research grant by the Fund for the Advancement of Education, staff members were designated for the various assignments on the project and the planning semester began. The assignments and the amount of time allotted to these jobs are shown in Table 1.

In addition to the people with designated roles, many other persons, both faculty and students, gave generously of their time to the project. Faculty members appeared on broadcasts, served voluntarily on the evaluation committee during the planning semester, and gave many valuable suggestions and comments both during the planning period and in reaction to the broadcasts. Students participated in a number of ways. They appeared on broadcasts as panelists, as actors in dramatic skits, and as performers in demonstrations of art forms. Thirty-two upper classmen and graduate students received credit for performing assigned tasks in the production and research areas.

Table 1.

Personnel assigned to the project and time each devoted to it from the initiation of the study to its termination.[1]

Position	*Time assigned to the project*				
	Spring '56	Summer '56	Fall '56	Spring '57	Summer '57
Project Director	¾	½	½	½	Full time
Executive Director	Assistant to the President—Assigned without specific time				
Project Evaluator		½	½	½	Full time
Teaching Staff					
Social Science 30	½		¼		
Psychology 10.1	½		¼		
English 6.1			½	¼	
Creative Arts 10			½	¼	
Production Director	½	½	¾	½	
Audio-Visual Director	1/6		½	¼	
Staff Artist	½	F.T.	F.T.	F.T.	F.T.
Project Secretary	F.T.	F.T.	F.T.	F.T.	F.T.
Production Secretary				½	
Student Assistants					
1. Research					
A			½	½	Full time
B			½	½	½
2. Production					
A			¼	Full time	
B			¼	Full time	

3. Teaching

The professor of each course was given a student assistant's fund of $700.00 to be used as he saw fit during the planning and teaching semesters of his course.

It became clear early in the planning semester for the project that the responsibilities for accomplishing this study fell into three major areas: teaching, television production, and evaluation research. As in all college teaching, the course instructors had prime responsibility for determining course content (within the limits set for the course as part of the General Education Program), selecting a text and related readings, preparing a course syllabus including assignments and outside work, and devising classroom examinations and other means for evaluating student achievement for grading purposes. The myriad details of presenting television broadcasts were handled by the production director. To cite a few of these, he made all arrangements with station KQED, blocked out each broadcast in advance in consultation with the professor and the audio-visual director, arranged for the procurement of all props and visual materials, conducted pre-broadcast rehearsals, etc. The project director was responsible for such overall administrative details of the study as the selection of subjects, making all special arrangements for classrooms, early registration of subjects, scheduling of experimental test periods, etc. During the planning semester for the project, he was assisted in delimiting the specific research aspects of the study by the faculty evaluation committee. Subsequent to this, all matters concerning the selection, administration, and analysis of evaluation instruments for the study were shared by him and the project evaluator.

The Evaluation Committee[2]

Because of the diversity and breadth of the questions raised in the proposal for this study, it was necessary to differentiate early between those questions for which research findings could provide "answers" and those for which less formal observational answers or comments could be obtained. While these matters were discussed along with others in the early meetings of all project personnel, it was through the efforts of the evaluation committee that specific research objectives for the study were set forth.

As a result of much thought and exploration it was decided that the various objectives put forth in the original proposal could best be achieved by dividing the study into three parts; a carefully controlled research area, a survey of outcomes in less easily controlled areas, and a descriptive analysis of factors not amenable to research techniques. The specific objectives under these three headings were as follows:

Controlled Research

1. To compare the performance of students in four general education courses as normally presented on the campus with student performance in the same courses especially prepared for presentation using the television medium.
2. To study the relationship of such factors as ability level, motivation, etc., to student performance in the courses.
3. To assess student attitudes toward telecourses.

Survey of Non-College Groups

1. High-ability high school students: to determine the college performance level of a group of high-ability high school seniors taking the televised course. (Discussion groups to be conducted by qualified high school teachers; evaluation of performance to be made only on regular course examinations; college credit to be given for successful performance.)
2. General public: to determine the relative performance level of viewers in the general public electing to take the

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[1] Since nearly all of the persons working on the project were regular faculty members at the college, the times given in this table represent release-time from teaching duties. The normal teaching load at the college is twelve units per semester. Thus, a professor listed above as "1/2-time" on the project would have taught six units (paid for out of college funds) and devoted half-time to the project, for which he was reimbursed out of the project budget.

[2] In addition to the project director, the following faculty members served on this committee during the spring of 1955: Dr. Robert Blackburn, who was then filling the position of College Evaluator; Dr. Shepard Insel, instructor for the experimental television course in psychology; and Dr. Walcott Beatty, who subsequently became the project evaluator.

televised courses for credit through the San Francisco State College Extension Division. (Lectures viewed at home; no campus discussions; course tests administered on the campus.)

Descriptive Analysis

1. To evaluate the effects upon the instructional staff of preparing and presenting telecourses.
2. To investigate problems involved in the production of college courses for broadcast television.
3. To assess differences in the relative effectiveness of the four experimental courses as telecourses.

In addition, Dr. J. Paul Leonard agreed to write a section of the final report discussing the implications of the study for higher education from the point of view of a college administrator. This discussion appears as Part III of this report.

The Advisory Board

As stipulated in the research proposal, project personnel were provided with the opportunity of checking their thinking and planning for the study with a group of consultants representing the diverse fields appropriate to this project. The College was extremely fortunate in obtaining the services of a group of outstanding persons whose specialties covered not only each of the subject-matter fields to be taught by television but also the areas of basic research design, educational and communications research, and institutional planning. The first meeting of this advisory board with project personnel took place on April 27, 1956.[1] Many of the details of the proposed study were discussed and clarified at the time of this meeting; and, in general, the board endorsed the execution of the study as outlined.

One major modification of the overall research proposal came out of this meeting. This was the addition of an On-Campus television group to simulate closed-circuit television. Arranging for this group did not involve the complicated problems of a true closed-circuit system, though it was necessary to equip a classroom with a standard television set to pick up the live broadcasts from station KQED. This classroom will be described later.

One technicality in research design did arise over the inclusion of the On-Campus television group. however. The problem concerned the handling of the bi-weekly discussion periods for which the group would be scheduled. A choice had to be made between rigid research design and practicality. From the standpoint of purity of design, the television instructor should have conducted the discussion meetings of this group, as he was scheduled to do for the At-Home television sections of his course. Asking him to carry this additional section, however, seemed an imposition upon the one-quarter release time he was supposed to have during the semester he was presenting the telecourse. Although the television instructors expressed a willingness to do this, it was felt that there was something to be said for having another instructor handle the discussion periods of the On-Campus television group. While such an arrangement introduced an instructor variable, this procedure has had a long history in college courses which follow a lecture-quiz section pattern. Furthermore, the use of quiz section leaders other than the telecourse lecturer was not uncommon in closed-circuit presentations, and their use for multiple-sectioned broadcast telecourses seemed inevitable. The decision was therefore reached before the close of the meeting with the Advisory Board to have an instructor other than the one teaching the telecourse responsible for the On-Campus television group.

Summary

Initiated at a time when systematic instruction by television seemed to hold promise as a means of expanding the facilities of higher education, the present study was undertaken to investigate specifically the potential role of broadcast telecourses viewed at home by regular college students. Within the broad outline of the research proposal to the Fund for the Advancement of Education, this study provides three general areas of findings: 1) the experimental investigation of the performance of college students in telecourses vs. regular classes, 2) a survey of the performance of non-college groups in the telecourses, and 3) a descriptive analysis of such factors in broadcast television instruction as effects upon the instructional staff, production problems, and overall institutional planning.

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[1] The writers wish to acknowledge the valuable assistance and support provided by the members of this board. In expressing our appreciation for their services, it is also important to make clear that any deficiencies in the execution or reporting of this study do not rest on them. Members of the advisory board were:

Dr. Raymond A. Bauer, Associate Professor of Psychology, Massachusetts Institute of Technology, Cambridge, Mass., (then at the Center for Advanced Study in Behavorial Sciences, Stanford University, Palo Alto, California.)

Dr. Arthur L. Brandon, Chairman, Committee on Broadcasting, University of Michigan, Ann Arbor, Michigan.

Dr. John E. Caffrey, Acting Director, Los Angeles Office, Education Testing Service, Los Angeles, California.

Dr. John B. Condliffe, Professor of Economics, University of California, Berkeley, California.

Dr. John G. Darley, Associate Dean, Graduate School, University of Minnesota, Minneapolis, Minnesota.

Dr. Raymond Faulkner, Executive Head, Department of Art and Architecture, Stanford University, Palo Alto, California.

Dr. Wilbur Schramm, Professor of Journalism, Institute for Communications Research, Stanford University, Palo Alto, California.

Dr. Roy E. Simpson, Director of Education, State of California, Sacramento, California.

At the second meeting of the board on April 29, 1957, Dr. Raymond Bauer was not present, and Dr. Simpson was represented by Dr. Francis W. Noel, Chief, Bureau of Audio-Visual Education, Sacramento, California, and Dr. James B. Enochs, Specialist in State College Curricula, Sacramento, California.

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III. The Experimental Design of the Research

The research portion of this study was concerned essentially with the question: do students achieve the objectives of a college course as well when the learning experience includes instruction by television as when instruction is given by the conventional classroom methods. In order to answer the question in its most general form, the courses chosen were the regular lower division General Education courses; the students were full time students carrying all courses, outside of the experiment, in the normal fashion; and the television portion of the courses included open circuit television for some groups, as well as the equivalent of closed circuit television for others.

The Hypotheses Tested

The hypotheses tested in this study were based on four general assumptions about learning outcomes attributable to experience in college courses. First, students in college courses will show an increase in knowledge as a result of their participation. Second, outcomes other than increased knowledge should also appear. In the present case, this is determined by the objectives of San Francisco State College's General Education Program which has been described in Chapter I. Third, the method which one uses normally has some inherent strengths or limitations which facilitate or inhibit certain kinds of learning. Fourth, student characteristics are differentially suited to various methods of teaching. In this research, each of these assumptions was tested in some degree.

The first assumption can be cast, without further specification, in the form of a null hypothesis, namely:

1. that there will be no differences in the amount of knowledge gained, relevant to the course, among the three groups taught by different methods.

The second assumption is not as readily tested. Some or all of the objectives of the General Education Program should be translated into hypotheses and tested. Unfortunately, the objectives of this program are not stated in such a way that precise translation into testable hypotheses is possible. There are well over 100 objectives listed in the description of the General Education Program. After a careful study of these, it appeared that many of the specific objectives would be measured on the general knowledge test appropriate to each course and on the tests given by the instructor during the course. Other than these, there seemed to be two important emphases in the program which might be measured. One was the general objective that students should understand themselves and the world better as a result of their course work. It seemed that increase in self-insight would provide a measure of this. The other general objective was that the student would become more accepting of himself and other people (respect for humanity). The measurement of this was attempted through the use of some of the newer instruments developed in research into the dynamics of personality and psychotherapy. These objectives can be cast in the form of hypotheses as follows:

2. that there will be no differences in the degree of achievement of General Education goals as measured by the course examinations and grades, among the three groups taught by different methods;
3. that there will be no differences in the gains in self-insight among the three groups taught by different methods;
4. that there will be no differences in increases of the feelings of acceptance of self and perception of how accepting others are of themselves among the three groups taught by different methods.

The third assumption, about the effect of the strengths and limitations of television, leads to some rather speculative thinking. The use of television for educational purposes is too new to characterize all of its strengths and weaknesses. One of its strengths, aside from the obvious one of reaching more people, is that it is possible to present materials or people that would not normally be available to the classroom instructor. Thus, it was possible to design and use special audio-visual aids. In addition, one course made extensive use of a group of actors to dramatize ideas, and several of the courses presented outstanding experts in various fields related to the course. None of these would have been available normally in the classroom. These and other features which were possible on television should make for the more effective achievement of the various course objectives. It was felt, therefore, that whatever effect these strengths of television had should appear in the tests of the first and second assumptions discussed above.

In the area of limitations, the situation was different. The most obvious limitation of television is the decreased personal contact between the instructor and the students. This difference should affect some of the outcomes discussed above, e.g., the degree of change in acceptance of self and perception of others' self-acceptance. It also seemed worthy of measurement in its own right. All of the students were taking other courses in the normal manner with the normal amount of contact with instructors and fellow students. Perhaps a single course by television would not really change anything. It was simple enough to test this with a sociometric instrument. This same lack of contact and its attendant problem of making it impossible to ask questions during class time also could be a source of dissatisfaction which would show up attitudinally. It was felt that questionnaire data should reveal this. Hypotheses about the effects of television limitations then took the following form:

5. that there will be no differences in the sociometric relations at the end of the course among the three groups taught by different methods;
6. that there will be no differences at the end of the course in attitudes toward their learning experience among the three groups taught by different methods.

The fourth assumption, that student characteristics are differentially suited to various methods of teaching, has not been clearly demonstrated. It seems logical that less intelligent students might benefit more in a situation providing personal attention than in the more impersonal lecture or television situation. This and other logically derived hypotheses are incorporated into this study as follows:

7. that there will be no differences in gains in knowledge among the three groups on the basis of student grade point averages at the beginning of each course;
8. that there will be no differences in gains on self-insight among the three groups on the basis of student grade point averages at the beginning of the experiment;
9. that there will be no differences in gains in knowledge among the three groups on the basis of student standings on college aptitude measures;
10. that there will be no differences in gains on self-insight among the three groups on the basis of student standing on college aptitude measures;
11. that there will be no differences in gains in knowledge among the three groups on the basis of student scores on auding (listening) ability;
12. that there will be no differences in gains on self-insight among the three groups on the basis of student scores on auding ability;
13. that there will be no differences in gains in knowledge among the three groups on the basis of student scores on the "need to achieve," as measured by a personality test;
14. that there will be no differences in gains on self-insight among the three groups on the basis of student scores on the "need to achieve," as measured by a personality test.

The Experimental Design

In order to test these hypotheses, regular college students in four different courses were placed in groups taught by three different methods. The three different methods were called, Control, On-Campus Television, and At-Home Television.

The Control group was a section of the course taught in exactly the same manner as it would have been had there been no experiment. The only differences between this group and other regular sections of the course were: 1) they had the instructor who was also making the television presentations; 2) they were aware of the research project and had volunteered to be in it; and 3) they were scheduled into other courses at the time of the television broadcast so that they would be unable to see it.

The On-Campus TV group met in a classroom two days a week to watch television broadcasts by the same instructor who was teaching the Control group. The content of the 45-minute broadcast, especially adapted for television presentation, was not necessarily identical with the material dealt with by the Control group. In addition to the broadcasts, they met every other week for two hours in a discussion group. Their instructor in the discussion group was a regular instructor for the course, but was not the same person who was broadcasting over television. In other words, this was similar to a closed circuit television presentation with a discussion leader different from the TV instructor.

The At-Home group had course schedules so arranged that they could leave the campus and watch the broadcast at home. In some cases, other members of their families watched with them, but they had no contact with fellow classmates during or immediately after the broadcast. They also had a discussion period every other week for two hours, but it was with the instructor who made the television broadcasts. Thus, they saw and listened to an instructor for 45-minute sessions over broadcast television and then met with him for a two-hour discussion period, following this pattern throughout the semester. Table 2 summarizes the characteristics of the three contrast groups.

Table 2.

Treatment of the three contrast groups in the study.

Control Class (1 Section)	*On-Campus TV Group* (1 Section)	*At-Home TV Group* (2 Sections)
1. Normal classroom use of audio-visual materials for the particular course.	1. Maximal use of TV medium, with special visual materials, production techniques, etc.	1. Maximal use of TV medium with special visual materials, production techniques, etc.
2. Scheduled in other classes on campus to preclude seeing TV broadcasts.	2. Two 45-minute TV classes weekly, viewed on campus *as a group*.	2. Two 45-minute TV classes weekly, viewed at home *individually*.
3. Regular classroom lecture and discussion; 3 hours per week *with same professor teaching the telecourses.*	3. Bi-weekly, 2-hour discussion periods with professor assigned as "quiz section" leader *(not TV professor)*	3. Bi-weekly, 2-hour, on-campus discussion periods *with TV professor.*

The classroom in which the broadcasts were viewed by the On-Campus TV group was a regular classroom in the Creative Arts Building on the campus. This classroom was selected for two major reasons. First, it was adjacent to the TV Research Project office, which simplified technical and administrative problems. For example, one antenna served the TV set in the project office in addition to the one in the classroom. Any irregularity in getting on the air or reception failure during the broadcast could be checked through the project office and explained to the class immediately. Second, this classroom had certain physical features which made it satisfactory for television viewing without modification. It was of average size and accommodated a class of forty students comfortably. The windows were equipped with heavy draw-drapes, which permitted the room to be darkened for daytime viewing. A storage wall within the classroom provided space in which the television set could be locked when it was not in use.

The television set used in the classroom was a Philco 24-inch "Golden D," Model UL 50.[1] The Audio-Visual Department of the College mounted the set on a tall table, with wheels and a slanted top. The front edge of the table (facing the class) was 50 inches high, and the rear edge was 52 inches high, which placed the screen at a good viewing angle from the tablet-arm chairs with which the room was provided. Since the chairs were not in fixed positions in the classroom, they were arranged prior to each telecast with an aisle in the center of the classroom, and the set was placed in a center-front position. At the first meeting of each class, the students who viewed the broadcasts in this classroom were asked to arrange themselves to permit maximum visibility of the screen, i.e., with short students in the front rows and toward the center aisle and tall students toward the back and sides of the room. One of the two graduate research assistants for the project watched each telecast with this group, serving a monitor (but not police) function with the On-Campus TV sections. He set up the viewing room in advance of the broadcast, passed out an attendance sheet for the students to sign, and made any necessary adjustment of the set, as occasion demanded.

While the research design outlined in Table 2 is the design actually used for the two courses presented during the Fall semester, one modification was made in it for the Spring semester courses. Both students and professors of the first two courses expressed the opinion that the discussion periods every other week were too far apart; and some believed that the two-hour discussion periods were not as efficient and productive as one-hour periods weekly would have been. In the light of this experience, and in deference to the strong wishes of the Basic Communications professor for weekly meetings with his television students, English 6.1 was scheduled for one-hour discussion periods every week during the Spring semester. This arrangement did, of course, maintain the same time ratio between television presentations and discussion periods used in the fall, namely, two-to-one.

Creative Arts 10 presented the most difficult problem of timing from the standpoint of the experimental design since this course, as it is normally presented on the campus, gives two units of credit, but requires four hours of students' time in laboratory-participation periods (two two-hour periods weekly). It was the unanimous opinion of the C.A. 10 staff that a one-hour laboratory participation period for this course was too short. Furthermore, there was the consideration that students in the experimental television sections should devote the same amount of time to the course as regular students. For these reasons, a weekly two-hour participation period was scheduled for the television groups. This, therefore, changed the time ratio of the basic design for this course to two television presentations to two hours in a participation-laboratory period. Only in the sense that this course had two broadcasts for every "lab period" was the original ratio of two-to-one maintained.

The Courses

The objectives of the four General Education courses used in this study are given in Appendix C. The details of their presentation are given in Table 3.

Subjects

Although the original research proposal called for the use of matched contrast groups in this study, the research staff found early in the planning semester that a pre-selection and matching of subjects for each of the courses was quite impossible. At the theoretical level, there was the perennial problem in matching human subjects of trying to determine salient and adequate bases for matching the groups. Even if an arbitrary set of criteria for matching had been established, however, a host of practical considerations would have stood in the way of their use.

Among the practical aspects of the situation which played an important part in the manner in which subjects were obtained for the study were:

1. The policy decision by the College administration during the planning semester that no student would be forced to participate in the study, and that participants in all groups should be student volunteers. This decision precluded the possibility of controlling individual differences in the groups through the random selection and assignment of students at the time of registration.

2. Participation in any of the groups required some concessions on the student's part. Even those students who volunteered for control sections were committed to taking afternoon classes daily. Not only were the meetings of control classes scheduled for the afternoon, but subjects in the control group were required to schedule some other class at the time of the telecourse broadcasts which were on alternate days from the control class meetings. Many students with afternoon jobs were, therefore, unable to volunteer for the study.

3. Although the On-Campus TV groups were scheduled for the telecourse only two afternoons a week, arranging a program to accommodate the two-hour discussion periods bi-weekly presented problems in programming. To reduce these problems, all students participating in the

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[1] The project is indebted to the Philco Corporation of Philadelphia, Pa., and its western representative, Mr. C. E. Lindstrom, for supplying both the classroom and the project office with such sets.

Table 3.

Summary of information pertinent to the presentation of the four experimental courses.

Course	*Contrast Group*	*Instructor*	*Broadcast Time*	*Discussion Leader*	*Discussion Time*
Psychology 10.1	At-Home TV	Dr. Insel	T. Th. 3:15-4:00	Dr. Insel	Alternate T's 7-9:00 P.M.
	On-Campus TV	Dr. Insel	T. Th. 3:15-4:00	Dr. Keston	Alternate T's 7-9:00 P.M.
	Control class met MWF 2:00; students scheduled in other classes during T. Th. broadcasts.				
Social Science 30	At-Home TV	Dr. Lantos	M. W. 3:15-4:00	Dr. Lantos	Alternate T's 8-10:00 A.M.
	On-Campus TV	Dr. Lantos	M. W. 3:15-4:00	Dr. Olson	Alternate T's 8-10:00 A.M.
	Control class met T. Th. 2:00; students scheduled in other classes during M. W. broadcasts.				
English 6.1	At-Home TV	Dr. Clark	M. W. 3:15-4:00	Dr. Clark	Th. 12-1:00 or 1:00-2:00
	On-Campus TV	Dr. Clark	M. W. 3:15-4:00	Dr. Anderson	F. 12:00-1:00
	Control class met MWF 1:00; students scheduled in other classes during M. W. broadcasts.				
Creative Arts 10	At-Home TV	Dr. Bryce Mr. Irving Mr. Lathrop Dr. Tegnell	T. Th. 1:00-1:45	Dr. Bryce Mr. Irving Mr. Lathrop Dr. Tegnell	W. 3:00-5:00
	On-Campus TV	As above	T. Th. 1:00-1:45	As above	W. 3:00-5:00
	Control class met T. Th. 2:00-4:00; students scheduled in other classes during T. Th. broadcasts.				

study were registered early at a special pre-registration period set aside for them. (Not only was this a practical necessity, but it was hoped that it would have a salutary effect upon students' volunteering!) There was still, however, some resistance to this experimental group because it was a telecourse and possibly because the discussion leader was not the professor teaching on television.

4. The At-Home TV groups were the most difficult to fill because of additional criteria that had to be met. The problems of programming were similar to those for the On-Campus TV group, with the added complication that the At-Home TV students had to have adequate time for commuting in their schedules between their last regular class on the campus and their viewing of the broadcasts at home.

Two other special requirements for this group were: 1) that they have a television set available at home and 2) that their set receive Channel 9, KQED.[1] In addition to these factors, student resistance to the At-Home TV groups—as the most experimental or irregular way of taking a college class—was clearly greater than for either of the other groups. Many students whose reception of KQED was satisfactory refused to participate in the At-Home group, but volunteered to be in one of the other groups. This problem will be discussed more fully later.

On the information sheets which students were asked to fill out, they indicated their willingness to participate in the study by checking one or more of the following alternatives: (I am willing to participate in the TV Research Project:)

A. As one of the At-Home television viewing students. ( )
B. As a member of the On-Campus television viewing class. ( )
C. As a member of the Control class (taught by the same instructor; non-TV) ( )
D. In any one of the above groups, as assigned. ( )

Students who checked only one of the first three alternatives were considered only for the group checked. For all the courses except Creative Arts Exploration, there were more control volunteers than needed to fill the control sections. From those who had volunteered, therefore, a random selection was made. From among students who indicated a willingness to participate in two of the groups (e.g., B and C above) alternate assignments (to B or C) were made. Students checking the "D" alternative above were randomly assigned to the three contrast groups.

Within this general framework, every effort was made to obtain comparable contrast groups *from among students who volunteered* to act as subjects for the study. Since the matter of obtaining subjects for each of the four courses entailed somewhat different, specific problems, however, each course must be described separately.

Psychology 10.1. All incoming freshmen received a letter about the TV Research Project and an information card (checklist) to mail to the Project Office when they were notified of their admission to the College (Summer, 1956). While not all of these cards were returned, there were many more volunteers than could be used, especially in the Control and On-Campus groups. Therefore, the random selection outlined above was followed.

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[1] During the Fall semester, a sizable area of San Francisco near the College did not receive this station without special antennae, and reception was not always dependable in some other sections of the Bay Area. During the College's Christmas holidays of 1956, the KQED transmitter was moved to a much better location which gave much improved coverage by the station. Therefore, this problem was greatly reduced by Spring semester.

Social Science 30. During the Spring semester of 1956, the Project Director visited all sections of Social Science 20 (prerequisite for S.S.30) to describe the television project, with its three contrast groups, and to have students complete information sheets, indicating willingness to participate. The responses of these second-semester freshmen who had been exposed to a variety of General Education courses on the campus were not enthusiastic over the prospects of taking a college course via television. Several kinds of concerns were expressed, having to do largely with lack of instructor contact, effects on grades, etc. However, with some explanation of the rationale of the study, its experimental nature, and its importance in future college planning, enough students had volunteered by the end of Spring semester to fill the Control and On-Campus sections. The two At-Home sections were still approximately forty students each, instead of the desired forty-five.

During the summer of 1956, approximately half of the students who had volunteered during the Spring semester notified the Project Office of their inability to participate in the study for the Fall semester. These drop-outs did not seem to be associated with the contrast group for which they had volunteered; and the reasons for dropping were typically, "not returning to school," "my work schedule for fall prevents my participation," etc. Of those students still remaining on our lists, some failed to show up for pre-registration. This meant that additional subjects had to be obtained at the regular registration period. Largely through the efforts of the Chairman of the Social Science Division and his staff, more students were added to the experimental classes at registration and during the first week of classes. The size of these sections still fell below the maximal class size of forty-five.

English 6.1 Since this course was for first semester freshmen, the same general procedure was followed as for Psychology 10.1. All new students admitted to the College for the Spring semester, 1957, were sent a letter about the project and a checklist information card to return to the Project Office. However, this procedure which had brought more than enough volunteers into the study during the fall, failed to fill the experimental sections of English prior to spring registration. Not only were many fewer freshmen admitted to the College for the second semester, but a smaller percentage of those admitted returned the information cards indicating a willingness to participate in the project. Consequently, the Project Director met all regular campus sections of the course at their first class meetings for the semester and "extracted" enough students to fill a second At-Home TV section. There were painful aspects to this process for the students as well as the Project Director. However, the majority of these reluctant volunteers were assisted in rearranging their programs to accommodate getting home for the television broadcasts and many of them ended up with much saner schedules of classes than they had had originally. As a result of this, a number of them expressed their appreciation for the changes which had been brought about by their participation in the project.

Creative Arts 10 This course presented more difficult administrative problems in locating subjects for the project than any of the others. There were three major reasons for this. First, unlike the other courses in the study C.A. 10 was not required during a specific semester in the G.E. program. This meant that there were no prior courses from which a pool of subjects for C.A. 10 might be drawn. Second, students were able to fulfill the C.A. 10 requirement by selecting one of a variety of other Creative Arts courses as a substitute for it. And finally, the scheduling of the television sections for meetings on Tuesday, Wednesday, and Thursday afternoons presented problems in programming.

In an effort to locate subjects, an article about the project and a sign-up form were published in the student newspaper toward the end of the first semester. Prior to the advising period, all G.E. advisers were sent a letter requesting their cooperation in registering their advisees for the C.A. 10 course for the Spring semester. Despite these efforts, there existed no machinery for channeling students into this course, and the number who signed up for the course voluntarily at registration was disappointingly small.

The difficulties of procuring subjects for this study not only caused administrative headaches but obviated the possibility of forming contrast groups by random selection. All of the results being sought assumed the initial comparability of the groups having the different learning experiences. This placed a heavier emphasis than usual for the establishment of group comparability upon a number of instruments administered prior to the beginning of the courses.

Comparability of Contrast Groups

Four major dimensions were measured on all students prior to the beginning of the courses. The groups were then compared on these variables to discover whether or not any important biases had been introduced by the selection procedures.

The first of these was a personality test, the Edwards' Personal Preference Schedule. This is a standardized instrument and the results of the standardizing procedures are reported in the manual (7). The Schedule attempts to measure the strength of 15 needs taken from Murray's list (16). Edwards has introduced a novel form of control into this Schedule. In the test, the student is forced to choose from paired statements, which have been equated on the basis of social acceptability. This tends to eliminate the possibility that choices represent the student's concern for choosing a statement which is socially approved. Without this criterion, he is therefore forced to rely upon some value system of his own, and so his choices should more nearly represent genuine needs which he has. It is uncertain just how these needs might influence behavior in a college course but, if the scores on such an instrument are distributed similarly through several groups, a possible source of motivational bias would seem to be eliminated.

The Personal Preference Schedule is scored on 15 variables, and Edwards provides test-retest coefficients for each of the variables in the manual for the test. These correlations range from .74 to .87. (7)

The second dimension measured was the ability of the students to derive meaning from what they hear. This was checked by using the Auding Test, Form G, a test recorded on a tape. (5). Students responded to vocabulary items and questions asked about passages which were read to them. Studies by the authors of this instrument indicate that auding is an ability involving the ears which is analagous to reading with its involvement of the eyes. This seemed to be a particularly appropriate instrument in view of the fact that major stress was placed on hearing accurately, since the opportunity to raise questions was so diminished for television groups. The data presented in the article referred to above indicate a reliability for the form of .79.

A third dimension measured was college aptitude as shown by standardized tests. The measures used were administered by the College Testing Office as part of a standard battery of entrance examinations. It happened that a change of instruments was decided upon by the college the year before this experiment and as a result, the sophomores participating in the study were given the American Council on Education Psychological Examination (1), and the freshmen were given the School and College Ability Tests (15). New forms of the ACE test are developed each year and reliability figures are not given for all forms, but published figures give a correlation coefficient of about .90. The manual for the SCAT lists a coefficient on the total test of .95.

The fourth dimension upon which a statement of comparability could be based was the grade point averages of the students made prior to entry into the television project. Since most of the participants were freshmen, these averages represented work done by the students during the last two years of high school. This is actually a rather mixed measure because the grades were not derived from any standard series of courses.

Additional dimensions for comparing groups existed and were used. In all cases where gains were being measured as a part of the research into outcomes, it was possible to use the pre-test results as a basis for comparisons among the groups. This was done in the area of knowledge of the course content in all courses except Creative Arts Exploration. Comparisons were made among all groups for each course of the pre-test results on the Self-Insight Scale (9), the Index of Adjustment and Values (2) and the sociometric test. A more detailed discussion of these instruments appears under the section describing the procedures for gathering data in the study. The groups were also tested for comparability on the basis of age.

While the four kinds of data described above, on personality, auding, college aptitude and grade point average, were introduced mainly to afford a basis for determining whether or not groups were comparable, these data were also available for investigating the effect of such variables on final course outcomes of the groups.

Comparability of Teaching Procedures

In the early stages of planning the courses to be presented in the project, a number of problems arose. The original proposal stated that a course would be presented to students by two different methods but the assumption was that it would be the same course, regardless of method. In all of the courses, with the possible exception of The American Economy, the instructors preparing the course raised serious objections to this assumption. Theoretically it is possible to reach the same objective by alternative routes, but it was the feeling of the instructors concerned that television did not offer any route to some objectives. In the Personal and Social Adjustment Course, for example, the objective of enabling students to analyze their own behaviors and experiences appeared to be difficult of achievement by television and limited discussion time. In the course in Basic Communication, the objective of increased skill in verbal communication seemed unsuited to television teaching. And in Creative Arts Exploration, the same was true of the objective of increasing the individual's skill in expressing himself through creative media. In all three of the examples given, heavy reliance was placed on individual participation in the regular classroom method of teaching. The adaptation of procedures to fit the television medium necessarily wrought changes in the course and it did not seem possible to specify the exact nature or extent of these changes. It is probably fair to say that the outcomes being measured in this study would not show the effect of these changes except to the extent that instructors were able to evaluate them in assigning grades. Even here, this is not in quantifiable form because instructors adjusted grades or examinations to fit the experience being provided to the student. Thus, the students in Creative Arts Exploration were not graded down because they were less able to express themselves when they had not had the opportunity to learn how. Until it is possible to define clearly all of the objectives of a course and then test for each of these objectives, it must remain a moot point whether two courses are equivalent when they employ radically different teaching techniques.

Procedures for Gathering Data

The data gathered were of several different types. Some data were gathered only one time, usually during the pretesting period; some data were gathered prior to the beginning of the course and then the same measurement was made again at the end of the course; and some data were gathered during the course. Table 4 lists all the data which were gathered and shows the time at which collected.

Table 4.

A list of the data gathered in the research study and the time at which they were collected.

Data	Pre-Test	During Semester	Post-Test
Edwards' Personal Preference Schedule	X		
Self-Insight Scale	X		X
Index of Adjustment and Values	X		X
Subject Matter Tests	X		X
Sociometric Scale	X		X
Auding Test		X	
Check List for TV Groups		X	
Data from Registrar		X	
Course Reaction Questionnaire			X

In gathering the data, appropriate precautions were taken so that there could be no leakage of information between groups. This was achieved mainly by having a pre-test period and a post-test period in which all students participated simultaneously. Most of the data gathered during the semester, mainly information from the Registrar's records and attitude data, were not of a kind where special care was necessary. In the case of the Auding Test, which was given to one or two contrast groups at a time during the semester, there was a possibility of leakage. However, the nature of the instrument itself probably minimized this problem.

The instruments used in gathering the data were a mixture of standarized and locally developed tests and will be discussed below. Table 5 lists the instruments and gives their coefficients of reliability. Since the term reliability is somewhat ambiguous and some of the coefficients below are measures of internal consistency and others of stability, the statistical measure employed is indicated where it is known. Some reliability figures have been omitted and the reason in each case will be indicated in the text under the discussion of the instrument.

Table 5.

The coefficients of reliability of the instruments used in the study.

Instrument	*r*
Edwards' Personal Preference Schedule	[1]
Psychology Subject Matter	.85[2]
Hill's Economics Test	.92[3]
Cooperative English Test Reading Comprehension	[1]
Creative Arts Subject Matter	.81[2]
Auding Test	.79‡
Self-Insight Scale	.85[2]
Index of Adjustment and Values	
Self	[1]
Others	[1]
School and College Aptitude Test	.95[3]
ACE Psychological Test	.90[3]

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[1] See text for discussion.
[2] Split-half with Spearman-Brown correction.
[3] Published data from the test manual.
‡ "Lower bound" Kuder-Richardson estimate.

The following discussion of the instruments is divided under headings which refer to the hypothesis which the instrument was chosen to test.

Knowledge. In all courses, except Creative Arts Exploration, subject matter tests were given prior to the course and at the end of the course.

In Personal and Social Adjustment, the test consisted of 97 items drawn up by the instructor. Most of the items were taken from the Instructor's Manuals accompanying the texts for the course (11, 13). The items were both true-false and multiple choice types. The reliability coefficient was derived by pooling the pre-test scores of all students taking the test and running a split-half correlation, corrected for the length of the test. The coefficient was .85 for the test.

In The American Economy, a standardized test, the Hill's Economics Test was used. The manual for this test gives a reliability coefficient of .92. (12).

In Basic Communication, the instructor felt strongly that no test existed which would do justice to the course content, nor was it felt that one could be devised within the short time available. It was decided to use a more general English test, the Cooperative English Test of Reading Comprehension (6), which had recently been administered as part of a standard battery given to all entering freshmen. While the complete relevancy of this test is questionable, it bears some relation to the purposes of the course and was considered a better solution than using no test. The manual published with this test gives no reliability figure. This is a speed test which students rarely finish. According to Gulliksen, "To the extent that a test is a speed test, the score depending on how rapidly a subject works in the given time limit, *there is no way of estimating the reliability* except by testing a second time with a parallel form." (10) Hence no reliability figure can be given here.

In Creative Arts Exploration, there were no standarized tests available. The course, as normally taught on the campus, does not emphasize an academic content, and since the specific details of the course were developed during the semester in which it was taught, it was not possible to devise a test in advance. A content test was constructed at the end of the course. Since no pre-test was given it was not possible to derive data on the gains of students in this area. A reliability estimate was made on the test by the method of rational equivalence (8), and it yielded a coefficient of .81.

Self-Insight. All students in all of the courses presented in the project were given a test of self-insight before the course and at the end. The test used is a partially standardized instrument devised by Gross at the University of Buffalo. In developing the instrument Gross used the following definition of self-insight:

> "Self-insight is the acceptance and admission of both the presence and absence of personality traits within one's self when this acceptance runs counter to a system of emotionally toned ideas or when the admission of the presence or absence of these traits clashes with one's own feelings of self-esteem." (9)

The statements used in the scale are consistent with the above definition and in addition met two criteria in the opinion of a large group of psychologist judges. These criteria are: 1, that each statement is either true or false for all people and 2, that the incorrect answer has higher social esteem value than the correct one.

The test consists of 37 items which students mark on a 5-point scale in terms of their degree of agreement or disagreement with the item. The article describing the instrument and the standardization procedures did not give a reliability coefficient. The pooled scores of the students in this study yielded a split-half correlation, corrected for the length of the test, of .85.

Self-Acceptance and Perception of Others' Self Acceptance. Students in all of the courses completed the Index of Adjustment and Values both before and after the course. This is an instrument developed and standardized by Bills for getting a measure of the degree to which an individual accepts himself and sees others as self-accepting. (2). The test consists of 49 adjectives which the student reacts to with regard to himself and with regard to other people. His first reaction is to how frequently the adjective decribes him. This is done on a 5 point scale, running from "seldom" to "most of the time." His next reaction is to how he feels about being this kind of a person. Again, the reaction is on a 5 point scale ranging from "I very much dislike being this kind of a person" to "I very much like being this kind of a person." Lastly, he reacts to the same adjectives in terms of how he would like to be, again on a 5 point scale. He then makes these same reactions according to the way he thinks other people would rate themselves. One score from the instrument is derived by summing a deviation score between how the individual sees himself and how he would like to be. A second score is obtained by summing the ratings in answer to how he feels about being the kind of person he is. The first of these scores gives an indication of how much the individual thinks he falls short of his ideal and the second indicates how accepting he is of himself under these conditions. The same two scores derived from his ratings of other people indicate how nearly he thinks other people approximate their ideals and how they feel about this condition.

The interpretation of these scores is based upon norms derived by Bills. A further discussion of how these data were treated will be found in the discussion of the results.

Sociometric Rating. The students in all of the courses were given a list of the names of all of their fellow students in the class and asked to rate how well they knew them on a 6-point scale. They were instructed to cross out the names of any students they did not know. This same procedure was repeated at the end of the course. These ratings can be compared among groups with regard to increase in the number of people known by each individual in the group.

Attitude Questionnaire. At the end of the courses all students were asked to fill in a short questionnaire in which they could express their feelings about the experience they had been through. (Copy in Appendix D). The questionnaire asked for the general reaction to TV, running from "dislike very much," to "extremely enthusiastic;" gave a checklist of items which they might feel were the major short-comings of their experience; and asked which of the three experiences, At-Home TV, On-Campus TV or regular classroom, they would select if they were taking a course next semester.

Additional Data. Data on age, high school grade point average, and SCAT or ACE scores were taken from the records of the Registrar. These data were used in determining the comparability of groups studied and as a basis for testing some of the hypotheses stated above.

One other attitude study conducted by a psychology graduate student will be presented in this report. This study was made upon the groups involved in the course, "Personal and Social Adjustment." A questionnaire consisting of 11 items explored the students' feelings about their experience in the Psychology course and their reactions to taking a course by television. This questionnaire was administered during the semester following the experiment proper.

Treatment of the Data

In most cases the manner of handling the data, in order to derive an interpretable finding, is perfectly straightforward and will be adequately described in the section presenting the results of the research. However, there are some considerations and techniques which should be discussed in a little greater detail.

Inter-course Comparisons. In testing a number of the hypotheses presented in this chapter the same instrument is being used with all groups in all courses. This immediately raises the question of how students in one course compared with students in another on certain variables. It is tempting to make such comparisons but after careful thought it appears that they would be essentially uninterpretable. The major reason for this is that any differences discovered could have been caused by instructor differences or differences in course objectives. Since it was not possible to equate or control either of these variables, there is no valid basis for making interpretations.

Comparisons of the Edwards' Personal Preference Schedule. The Edwards' Schedule gives scores for each student on 15 variables. In order to determine whether the groups having different instructional experiences were actually comparable on these variables, the 15 scores were treated as a personality profile. Group profiles were determined using a technique devised by Block, Levine and McNemar (4). The group profiles were then compared in three different ways, one, with regard to the general configuration of the profiles, two, with regard to the within groups variance of the profiles and three, with regard to the variance on all the variables among groups. This is a modification of triple classification analysis of variance. It was assumed that the groups could be considered comparable in the F ratios from the first and second of these three treatments were not significant. Since the variables on the test were designed to be "independent" (and yielded low positive or negative intercorrelations), it would be expected that the third treatment would result in a significant F ratio in each case.

Gains between Pre- and Post-tests. The interpretation of gains made by students between two administrations of an instrument is problematical. Two assumptions are normally made which make possible an interpretation of findings. One of these is that the errors of measurement are randomly distributed around the mean, and hence it is possible to consider the mean as a true estimate of gain for the total group. The other assumption is that the intervals of the scale are equal so that gains starting from any initial score are comparable if allowance is made for the errors of measurement. Neither of these assumptions causes any problems when means are being compared between groups. But both of them must be considered if any comparisons are to be made of individual scores or of blocks of scores taken from the upper or lower ends of the total distribution of scores.

These assumptions are being made in this study. However, since a number of comparisons were made which involved using only a portion of the scores, for example, the upper or lower 27% of the scores, an adjustment was made to eliminate errors of measurement. This was done by deriving a least squares linear regression equation for estimating gain from the initial and final scores. (14). Such an equation was obtained for each group and in every case where gains, other than the difference between means, are used, the figures are "true gains" as estimated by Lord's method for deriving such a regression equation.

Summary

Research investigating the effects of different teaching methods on learning has not been very successful in developing either criteria or instruments which show differential outcomes. This fact raises a question about the validity of the outcomes in the present research.

With this caution in mind, hypotheses were formulated with regard to increase in knowledge, the accomplishment of other course objectives, the effect of television on sociometric relations and attitudes, and the factors which might influence the performance of students taught by different methods.

The design of the experiment was to compare outcomes in four General Education courses, each one presented by three different methods. One group was taught on campus in the usual classroom manner by the same professor teaching on television. A second group watched two television broadcasts a week in their own homes and met with the television professor two hours every other week for a discussion period. The third group met in a classroom on campus and watched the same television broadcasts, but met with a different instructor for their two-hour bi-weekly discussions. There was some variation of this pattern in two of the courses to meet special requirements.

Instruments were selected for testing each of the hypotheses under the conditions of the design.

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IV. Results of the Research (Part 1)

The findings of the research portion of this project will be presented in this and the following chapter. In this chapter the findings will be reported in three sections. The first section will be concerned with outcomes of the checks made on the comparability of the various groups used in the study. The second section will present the comparisons of television and non-television groups on a number of variables. Section three will report the findings with regard to various factors which it was presumed might have some effect upon outcomes in groups taught by different methods.

Chapter V is devoted to sociometric data from the various classes and to student attitudes toward instructional television. In presenting outcomes, the data will be organized under the relevant hypotheses as they were set forth in Chapter III. For purposes of economy and convenience the data from all four courses will be presented together; but, as indicated in Chapter III, no comparisons between courses are considered valid and inter-course interpretations will not be made.

Since a variety of statistical techniques have been used for determining the significance among the contrast groups in this study, all differences which reach the 5% level of significance are indicated in the tables with a single asterisk. Differences significant at the 1% level, are denoted with a double asterisk. All differences which are not so designated fall short of a minimal significance level and cannot, therefore, be accepted as representing true differences.

Comparability of the Groups

Because of various administrative problems discussed in the last chapter, it was impossible to assign students randomly to groups taught by differing methods. This made it imperative that some check of the initial comparability of the groups be made.

The most complex single measure of comparability used was the Edwards' Personal Preference Schedule. The schedule is scored on 15 variables intended to measure the needs of the individuals. These scores, transformed into standard scores, were used as personality profiles and an analysis of variance was carried out to test for differences in group profile patterns. The results of this analysis are shown in Tables 6, 7, 8 and 9, for the contrast groups in each of the four courses.

The F ratios in the last column of the tables indicate the sources of variation being tested. These are variance estimates derived from the differences among the means of the scores on each of the variables, differences among the overall means of each of the groups, and the variable by group interaction. It has been shown (3, p. 335) that the variable by group interaction tells whether there are significant differences among the profiles for the groups.

The tables show that for each of the courses, the variable by group interaction is not significant. The overall means of

Table 6.

Analysis of variance to test for the existence of significant differences on the Edwards' Personal Preference Schedule among the four Psychology classes taught by three different methods: 15 variables, four groups, and 32 individuals per group.

Source	Sum of Squares	df	Variance Est.	F ratio
Variables	6,270.779	14	447.912	4.403**
Groups	7.159	3	2.386	2.305
Individuals	128.397	124	1.035	
Variables by Group Interaction	4,436.682	42	105.635	1.038
Residual	176,599.207	1736	101.727	
Total	187,442.224	1919		

**significant at the 1% level.

Table 7.

Analysis of variance to test for the existence of significant differences on the Edwards' Personal Preference Schedule among 3 Economics classes taught by 3 different methods: 15 variables, three groups and 31 individuals per group.

Source	Sum of Squares	df	Variance Est.	F ratio
Variables	3545.343	14	253.239	2.340**
Groups	4.457	2	2.229	1.613
Individuals	124.391	90	1.382	
Variables by Group Interaction	2051.199	28	73.257	.677
Residual	136,356.125	1260	108.219	
Total	142,081.515	1394		

**significant at the 1% level.

Table 8.

Analysis of variance to test for the existence of significant differences on the Edwards' Personal Preference Schedule among 3 Basic Communication classes taught by 3 different methods: 15 variables, 3 groups and 24 individuals per group.

Source	Sum of Squares	df	Variance Est.	F ratio
Variables	3,121.524	14	222.966	2.018*
Groups	18.369	2	9.185	2.780
Individuals	227.950	69	3.304	
Variables by Group Interaction	3,079.159	28	109.970	.955
Residual	106,724.050	966	110.480	
Total	113,171.052	1,079	104.885	

*significant at the 5% level.

Table 9.

Analysis of variance to test for the existence of significant differences on the Edwards' Personal Preference Schedule among 3 Creative Arts classes taught by 3 different methods: 15 variables, 2 groups†, and 27 individuals per group.

Source	Sum of Squares	df	Variance Est.	F ratio
Variables	2,477.911	14	176.994	1.76*
Groups	.242	1	.242	.036
Individuals	348.879	52	6.709	
Variables by Group Interaction	1,402.461	14	100.176	.996
Residual	73,168.158	728	100.506	
Total	77,397.654	809		

†The At-Home television and On-Campus television sections were grouped together because of the small number of individuals.

*significant at the 5% level.

the groups do not vary significantly either. The differences among variables are significant. This is interpreted as meaning that the different variables are actually measuring different things, or are independent. This finding is as expected and has no bearing on the hypothesis with regard to the comparability of the groups. The results of this analysis of variance support the assumption that the contrast groups are comparable with regard to personality variables.

Data were gathered on each of the students concerning age, high school or college grade point average, scores on the Auding Test, a Self-Insight Test, the School and College Ability Test or the American Council on Education Psychological Test, and on subject matter tests related to the content of the course. An analysis of variance was made of each of these sets of data in order to compare the groups in each course. Tables 10, 11, 12, and 13 give the results of these analyses for each of the courses involved in this experiment.

The last column in each of these tables gives the results of the statistical analyses made. None of the F's or t's shown reach a significant level. This means that the slight variations between groups on the various dimensions measured are no greater than would be expected by chance.

Table 10.

Analysis of variance of the pre-course scores on a number of variables for the three contrast groups in Psychology.

Variable	*Group*	*N*	*Mean*	*S.D.*	*F ratio*
High School Grade Point Average	Control	31	2.97	.37	.53
	Campus TV	31	2.96	.42	
	At-Home TV	62	2.89	.40	
School and College Ability Test	Control	31	48.16	6.29	1.43
	Campus TV	31	50.10	5.02	
	At-Home TV	62	47.52	7.94	
Age	Control	32	17.53	1.66	1.69
	Campus TV	32	17.41	.83	
	At-Home TV	64	19.06	5.20	
Auding	Control	30	56.37	5.89	.22
	Campus TV	30	55.83	6.41	
	At-Home TV	60	55.38	6.66	
Self-Insight Test	Control	36	54.19	12.59	.46
	Campus TV	37	53.35	13.10	
	At-Home TV	62	52.77	12.76	
Subject Matter Test	Control	36	48.92	18.96	2.21
	Campus TV	37	47.95	19.79	
	At-Home TV	62	54.55	17.16	

Table 11.

Analysis of variance of the pre-course scores on a number of variables for the three contrast groups in Economics.

Variable	*Group*	*N*	*Mean*	*S.D.*	*F ratio*
College Grade Point Average	Control	31	2.49	.51	.55
	Campus TV	31	2.48	.42	
	At-Home TV	31	2.61	.63	
ACE Psychological Examination	Control	31	52.10	8.85	.29
	Campus TV	31	50.97	8.37	
	At-Home TV	31	52.68	9.18	
Age	Control	33	22.30	3.12	.47
	Campus TV	33	21.67	4.44	
	At-Home TV	33	22.91	6.80	
Auding	Control	29	59.31	6.46	.22
	Campus TV	29	58.35	6.58	
	At-Home TV	29	58.35	5.99	
Self-Insight Test	Control	39	53.87	19.55	.85
	Campus TV	24	58.46	18.36	
	At-Home TV	40	58.05	19.19	
Hill's Economics Test	Control	40	99.08	27.70	.73
	Campus TV	25	94.16	25.28	
	At-Home TV	41	94.90	25.60	

Table 12.

Analysis of variance of the pre-course scores on a number of variables for the 3 contrast groups in Basic Communication.

Variable	*Group*	*N*	*Mean*	*S.D.*	*F ratio*
High School Grade Point Average	Control	21	2.65	.36	1.42
	Campus TV	21	2.90	.55	
	At-Home TV	42	2.77	.50	
School and College Ability Test	Control	20	49.15	6.73	.36
	Campus TV	20	50.90	6.24	
	At-Home TV	40	49.30	8.46	
Age	Control	28	20.57	3.75	2.85
	Campus TV	28	20.79	4.17	
	At-Home TV	28	18.79	1.56	
Auding	Control	24	56.00	6.30	.25
	Campus TV	24	57.25	4.19	
	At-Home TV	24	56.42	7.22	
Self-Insight Test	Control	23	51.17	14.57	.27
	Campus TV	24	54.29	15.45	
	At-Home TV	31	53.65	15.01	
Coop. Eng. Test Reading Comprehension	Control	24	53.46	6.34	2.98
	Campus TV	24	58.42	5.01	
	At-Home TV	31	55.35	8.58	

Table 13.

t tests of the pre-course scores on a number of variables for the three contrast groups in Creative Arts Exploration.

Variable	*Group*	*N*	*Mean*	*S.D.*	*t test*	
High School Grade Point Average	Control	16	2.92	.45	Control vs. Campus	.24
	Campus TV	18	2.96	.50	Control vs. At-Home	.25
	At-Home TV	6	2.87	.36	Campus vs. At-Home	.45
School and College Ability Test	Control	18	46.72	6.58	Control vs. Campus	.60
	Campus TV	15	44.87	9.84	Control vs. At-Home	1.15
	At-Home TV	6	50.33	6.05	Campus vs. At-Home	1.45
Age	Control	26	20.81	2.82	Control vs. Campus	.15
	Campus TV	18	20.67	3.01	Control vs. At-Home	.75
	At-Home TV	7	23.14	7.52	Campus vs. At-Home	.78
Auding	Control	26	53.96	7.86	Control vs. Campus	.20
	Campus TV	19	53.53	6.40	Control vs. At-Home	.63
	At-Home TV	9	56.11	8.54	Campus vs. At-Home	.76
Self-Insight Test	Control	26	59.81	15.99	Control vs. Campus	.28
	Campus TV	14	58.50	12.29	Control vs. At-Home	1.22
	At-Home TV	8	50.75	17.75	Campus vs. At-Home	1.03

There was no pre-course content test given in Creative Arts 10.

Summary. These findings are interpreted to mean that on the personality variables measured by the Edwards', and the variables of age, high school or college grade point average, Auding scores, Self-Insight, college entrance examinations and subject matter tests, the various groups in each course were not significantly different. In other words, within each course, the various groups taking that course were comparable. Thus, although it was not possible to set up a design in which individuals were randomly assigned to groups, no sampling biases appeared among the contrast groups for any course. No attempt was made to test comparability among groups in the four different courses since no cross-course comparisons were being made.

Comparisons of the TV and Non-TV Teaching

In each of the four courses included in this project there were classes taught by three different methods. These have been described in detail in Chapter III. Data were gathered from all classes, before, during, and at the end of the course in order to determine the effects of the varying experiences. The comparisons of data which were made are presented below under headings which indicate the hypothesis which the comparison was designed to test.

Subject Matter Achievement. The groups in all courses were administered subject matter examinations to test the hypothesis (Number 1) *that there would be no differences in the amount of knowledge gained, relevant to the course, among the groups taught by different methods.*

Since the groups were comparable at the beginning of each course, an analysis of variance of the post-test scores was made to determine if any group had forged ahead significantly in knowledge of the subject matter. These comparisons for the groups in courses which had both pre- and post-tests are given in Table 14.

Table 14.

Analysis of variance of the post-test scores on subject matter for classes taught by three different methods in each of three courses.

Course	N	Mean	S.D.	F ratio
Psychology				
Control	36	64.50	14.27	1.15
Campus TV	37	67.54	13.15	
At-Home TV	62	66.24	12.59	
Economics				
Control	40	111.70	24.02	.99
Campus TV	25	105.84	28.69	
At-Home TV	41	110.63	24.02	
Basic Communication				
Control	24	56.96	7.01	2.12
Campus TV	24	61.13	5.79	
At-Home TV	31	47.74	8.62	

The F ratios in the last column are all non-significant, indicating that all groups in these courses were still comparable at the end of the semester. This finding is interpreted as meaning that for the three methods of course presentation used in this study no one method produced a greater increase in knowledge of subject matter than any other.

The means of pre- and post-tests of every group in each course were submitted to a t test to determine whether or not the *gains* made during the semester were significant. The Creative Arts course was again excluded since there was no pre-test in this course. The results of the t test are given in Table 15. All of the t ratios in the last column are significant, which means that each group in each course did gain significantly in knowledge of the subject matter of the course.

Table 15.

t test of the differences between pre- and post-test means on a subject matter test for each of the groups in each of three courses.

Course	N	Pre-Test Mean	S.D.	Post-Test Mean	S.D.	t test
Psychology						
Control	36	54.19	12.59	64.50	14.27	4.03**
Campus TV	37	53.35	13.10	67.54	13.15	5.31**
At-Home TV	62	52.77	12.76	66.24	12.59	7.79**
Economics						
Control	40	99.08	27.70	111.70	24.02	2.70*
Campus TV	24	93.62	25.59	108.00	27.51	2.09*
At-Home TV	41	94.90	25.60	110.63	24.02	3.37*
Basic Communication						
Control	24	53.46	6.34	56.96	7.01	3.73**
Campus TV	24	58.42	5.01	61.13	5.79	4.08**
At-Home TV	31	55.35	8.58	57.74	8.62	3.19**

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*significant at the 5% level.
**significant at the 1% level.

In addition to the above subject matter tests which were administered by the project research staff, the course instructors used examinations and term papers in the courses as a basis for assigning course grades. It was hypothesized (Number 2) *that there would be no differences in the degree of achievement of General Education goals, as measured by the course examinations and grades, among the three groups taught by different methods.* The frequencies of various grades assigned to students in the four courses were tested for significant variations by a chi square test. The results are shown in Table 16 for all courses.

Table 16.

Chi square test of the different frequencies of grades assigned for each of the groups in each of the courses.

Course	N	A	B	C	D	F	df	X^2
Psychology								
Control	36	6	12	15	3	0	8	12.08
Campus TV	37	5	7	22	2	1		
At-Home TV	64	8	30	24	2	0		
Economics								
Control	45	8	11	15	6	5	8	4.53
Campus TV	32	3	7	11	6	5		
At-Home TV	47	7	8	22	5	5		
Basic Communication								
Control	25	4	5	13	3	0	8	9.73
Campus TV	26	3	8	10	1	4		
At-Home TV	33	4	11	8	5	5		
Creative Arts								
Control	26	2	10	11	2	1	8	4.97
Campus TV	18	1	11	5	1	0		
At-Home TV	7	0	5	2	0	0		

None of the chi squares is significant. This is interpreted as further verifying the earlier finding that there were no differences among groups in any of the courses with regard to achievement.

The Psychology, Economics, and Creative Arts courses used course examinations which yielded numerical scores. A comparison of the groups in these courses on a basis of cumulative numerical score is given in Table 17. None of the differences in Psychology or Economics was significant. In the Creative Arts course the On-Campus TV group scored significantly higher than the Control group. This is difficult to interpret. The On-Campus TV group did not receive higher course grades (see Table 16). Furthermore, the con-

Table 17.

t tests of cumulative total scores on course examinations for the contrast groups in Psychology, Economics and C.A.10.†

Course	*N*	*Mean*	*S.D.*		*t test*
Psychology					
Control	36	113.27	13.23	Control vs. Campus	.39
On-Campus TV	37	114.54	14.33	Control vs. At-Home	.26
At-Home TV	64	114.04	15.94	Campus vs. At-Home	.16
Economics					
Control	39	314.87	31.18	Control vs. Campus	1.33
On-Campus TV	26	328.85	45.95	Control vs. At-Home	.59
At-Home TV	42	310.76	30.10	Campus vs. At-Home	1.75
C.A. 10					
Control	26	67.88	6.98	Control vs. Campus	2.57*
On-Campus TV	17	73.41	6.56	Control vs. At-Home	.24
At-Home TV	9	68.56	7.05	Campus vs. At-Home	1.63

†Since all grades used in Basic Communication were letter grades, this course is not included in this analysis.
*significant at the 5% level.

tent examination was not considered by the instructors to be the best measure of course outcomes which normally emphasize participation in the various arts. It would seem, therefore, that this finding does not mean that students get more out of the course in the On-Campus TV group, but that they were able to respond to the content more effectively. Further doubt might be cast upon this outcome when one examines the test. It was a locally devised test with a split-half reliability of .81. While this is not exceptionally low, it does raise some question about the stability of the instrument.

Summary. On the basis of all of the findings with regard to subject matter achievement, there does not seem to be sufficient evidence to reject the hypothesis that there are no differences among groups taught by regular classroom methods, in an On-Campus TV group or in an At-Home TV group. In this study, both professors' evaluations and special content examinations showed the achievement of the three contrast groups to be comparable for each course.

Self-Insight. The General Education courses are predicated upon an assumption that the particular skills or content involved in the courses contribute to the overall development of the individual as an effective person. One aspect of this development concerns understanding of oneself in relation to the world, and so a hypothesis (Number 3), was set up *that there would be no differences in the gains in self-insight among the groups taught by different methods.*

All groups were given a self-insight test at the beginning and the end of the course. The pre-test data given in Tables 10, 11, 12, and 13, show the classes destined to be taught by differing methods were all comparable in their scores on the Self-Insight Test. At the end of the course each group was given the test again and an analysis of variance was made of the scores to see whether the groups were still comparable. In addition, a t test was used to determine whether or not there had been significant gains in self-insight as measured by this instrument. The results of these analyses are given for all courses in Tables 18 and 19.

Table 18.

Analysis of variance of the post-test scores on the Self-Insight Test of groups taught by different methods for courses in Psychology, Economics, Basic Communication, and Creative Arts.

Course	N	Mean	S.D.	F ratio
Psychology				
Control	36	58.42	19.13	.61
Campus TV	37	58.27	17.43	
At-Home TV	62	62.19	16.97	
Economics				
Control	39	58.46	20.73	.95
Campus TV	24	63.42	20.43	
At-Home TV	40	57.80	16.59	
Basic Communication				
Control	23	73.52	23.53	.89
Campus TV	24	78.46	11.04	
At-Home TV	26	71.19	20.63	
Creative Arts				
Control	26	77.50	16.94	.91
Campus TV	14	75.07	17.17	
At-Home TV	8	76.88	13.59	

Table 19.

t test to determine the significance of the gains between the pre- and post-tests scores on Self-Insight for groups taught by differing methods in courses in Psychology, Economics, Basic Communication and Creative Arts.

Course	N	Pre-Test Mean	S.D.	Post-Test Mean	S.D.	t test
Psychology						
Control	36	48.92	18.96	58.42	19.13	3.56**
Campus TV	37	47.95	19.79	58.27	17.43	3.54**
At-Home TV	62	54.55	17.16	62.19	16.97	3.55**
Economics						
Control	39	53.87	19.55	58.46	20.73	1.79
Campus TV	24	58.46	18.36	63.42	20.43	1.21
At-Home TV	40	58.05	19.19	57.80	16.59	.09
Basic Communication						
Control	23	51.17	14.57	73.52	23.53	3.61**
Campus TV	24	54.29	15.45	78.46	11.04	6.33**
At-Home TV	26	53.65	15.01	71.19	20.63	3.30**
Creative Arts						
Control	26	59.81	17.94	77.50	20.10	2.42*
On-Campus and At-Home TV (combined)	22	55.68	19.57	75.73	23.25	3.31*

*significant at the 5% level.
**significant at the 1% level.

Table 18 shows that all groups within each of the courses were comparable in their scores at the end of the semester, indicating that no one method was more successful than any other in developing self-insight. Table 19 shows, that while increase in self-insight varied from course to course, the findings within each course are consistent and offer no support to the idea that one method of course presentation is superior to another in developing self-insight.

Summary. Apparently different courses are not equally effective in developing self-insight, but the different methods of teaching used in this study seem to have no effect on these outcomes.

Self Acceptance and Perception of Others' Self Acceptance. Another very important value stressed in the General Education program is the development of respect for humanity. The Index of Adjustment and Values attempts to measure "self-acceptance" and "perception of others' self-acceptance," which appear to be attributes closely associated with respect for humanity. It was therefore hypothesized (Hypothesis 4) *that there would be no differences in increases in the feelings of acceptance of self and perception of how accepting others are of themselves among the three groups taught by different methods.*

The Index of Adjustment and Values was administered to all groups at the beginning of the course and again at the end. There are two parts to the instrument, one measuring an individual's self acceptance and the other measuring an individual's perception of how others accept themselves. Bills, in developing the Index has established a norm for each part, which is the mean score based on several hundred cases. He has demonstrated, with regard to the part on acceptance of self, that individuals who score at or around the mean are better adjusted than ones who score much above or below the mean. (1) In further studies combining the two parts of the instrument and scoring people as plus or minus on each part, depending on whether their score was above or below the mean, he has found correlations between these ratings and other attributes. (2) It is beyond the scope of this report to go into detail but generally the ++ people, that is, people who accept themselves and who believe that other people in their peer group are equally or more accepting of themselves, are "democratic individuals who have a high regard for the dignity, worth, and integrity of people, including themselves. . ."

On the basis of these qualities of the instrument, two comparisons were made between the groups taught by different methods. A chi square test was made to see whether or not there were the same number of people in each group who moved more than the standard error of measurement of the instrument in the direction of the norm (mean) on the test of self-acceptance. The results of this test are shown in Table 20.

Table 20.

Chi square test of movement exceeding the standard error of measurement on the Index of Adjustment and Values for all groups in each of the four courses.

Course	Movement Toward Mean	Movement Not Significant	Movement Away from Mean	X^2
Psychology				
Control	9	21	6	11.48*
Campus TV	2	29	6	
At-Home TV	4	51	6	
Economics				
Control	4	28	7	4.01
Campus TV	3	16	6	
At-Home TV	1	34	6	
Basic Communication				
Control	2	20	0	4.41
Campus TV	3	18	3	
At-Home TV	1	24	3	
Creative Arts				
Control	5	20	1	9.16
Campus TV	2	8	4	
At-Home TV	0	8	0	

*significant at the 5% level.

Table 20 indicates that in the Psychology course movement toward the norm in "acceptance of self" was significantly greater for one group than for the others taking the course. This group was the regular class as taught on the campus. Such a finding cannot be ignored, but it must be interpreted with caution. The "group process" techniques which were used in the course could certainly operate more effectively when a group met three times a week than was possible in the groups meeting once every other week. Research has shown that such techniques have therapeutic value for students and this finding would seem to be in agreement. On the other hand, while there was class discussion in the other courses, group process techniques, as such, were not normal course procedure for them. The findings in the other courses show that no differences among groups emerged. A possible conclusion to be drawn is that television teaching in this study was not adapted to group process techniques and therefore failed to achieve an outcome which a non-television course did. Of course, there is no evidence that regular classroom teaching *per se* achieves anything measured by this instrument more effectively than television teaching.

The other comparison was again a chi square test to determine whether any group ended up with a significantly greater number of ++ people. Table 21 is a comparison of groups at the beginning of the course with regard to the distribution of scores on the Index, and Table 22 is a comparison of groups at the end of the course.

Table 21.

Chi square test of differences in pre-test scores above and below the means on the Index of Adjustment and Values for all groups in each of four courses.

Course	++	+−	−+	−−	df	X^2
Psychology						
Control	16	6	4	10	6	1.54
Campus TV	18	6	5	8		
At-Home TV	26	8	7	20		
Economics						
Control	3	20	12	9	6	2.87
Campus TV	3	11	10	4		
At-Home TV	6	20	15	5		
Basic Communication						
Control	2	10	7	3	6	3.32
Campus TV	5	9	6	4		
At-Home TV	3	9	9	7		
Creative Arts						
Control	3	10	10	3	6	5.17
Campus TV	3	3	5	3		
At-Home TV	0	2	3	3		

Table 22.

Chi square test of the differences in post-test scores above and below the means on the Index of Adjustment and Values for all groups in each of the four courses.

Course	++	+−	−+	−−	df	X^2
Psychology						
Control	20	8	4	4	6	8.40
Campus TV	20	7	2	8		
At-Home TV	21	13	8	19		
Economics						
Control	3	12	10	8	6	2.26
Campus TV	3	14	7	4		
At-Home TV	6	15	13	8		
Basic Communication						
Control	1	12	4	5	6	6.51
Campus TV	1	14	6	3		
At-Home TV	4	14	9	1		
Creative Arts						
Control	3	14	4	5	6	7.99
Campus TV	0	9	5	0		
At-Home TV	2	4	1	1		

Table 21 shows that at the beginning of the courses the groups within each course were comparable with regard to the distribution of people who showed varying degrees of self-acceptance and attributed self-accepting attitudes to others.

Table 22 shows that at the end of the courses these distributions among groups were still comparable. This is interpreted as meaning that the different teaching methods did not affect the outcomes on self-acceptance or seeing others as self-accepting.

Summary. Although in the Psychology Control class students moved in the direction of the norm of self-acceptance during the course, total scores on the Bills (Self and Others) showed no significant differences among groups. It would appear that classroom teaching in general is not more effective than television in developing greater self-acceptance or perceptions of other people as self-accepting. Consequently, this evidence provides no basis for rejecting the hypothesis that there are no differences among the groups taught by the three methods in increases in feelings of acceptance of self or perception of how accepting others are of themselves as measured by the Index of Adjustment and Values.

Factors Influencing Performance in Classes Taught by Different Methods

With the variety of data available on the students taking the four courses by different methods it was possible to test a number of hypotheses about the effects of motivation, college aptitude, auding ability, and achievement need upon the performance of students taking courses taught by three different methods in this study.

Motivation. It is very difficult to measure or control motivation with human subjects. The various definitions of the term have stressed different aspects of behavior. At least three usages of the term are commonly made, namely, motivation is: the activating urge, the determiner of direction of action, or the determiner of intensity of action. In this study, the first two usages were ignored. It was felt that some indication of the intensity with which an individual usually reacted to academic situations might be inferred on the basis of his previous grade point average. For the first semester freshmen (in Psychology 10.1, English 6.1 and Creative Arts 10) previous grade point average was based upon the last two years in high school. For the college sophomores (in Economics) previous grade point average was based upon grades earned during the freshman year in college.

The hypothesis (Number 7) was tested *that there would be no differences in gains in knowledge among the three groups on the basis of student grade point averages at the beginning of the course.* To do this, the top and bottom 27% of each group were selected and compared to discover whether high or low grade point averages might be associated with performance in the learning situations. These findings are reported only for Psychology and Economics. The nature of the Basic Communication test was such that it was not possible to compute true gains, and in the Creative Arts course no subject matter pre-test was given.

Statistical analyses were made of the subject matter gains made by the students who comprised the top 27% on grade point average in each group in Psychology and Economics. The results are presented in Table 23.

Table 23 shows that in the Psychology course the students with high grade point averages performed significantly better in the television groups than in the Control group. The same trend appeared in the Economics course, but the differences did not reach significance.

The converse of this question was answered by taking the subject matter gains scores of students in the lowest 27% of their groups on grade point averages. The results of the critical ratios performed on these scores for groups in two of the courses are shown in Table 24. Although students with low grade point averages in the On-Campus TV group in Psychology did make significantly greater gains on subject matter tests than the Control group, no other significant differences appeared in Psychology and none showed up among the groups in Economics. It is not clear from the data at hand why this one significant difference appeared, but on the basis of the overall results given in Table 24, there is not sufficient evidence to reject the null hypothesis.

Table 23.

t tests of the gains scores of students who were in the upper 27% of their contrast groups on a basis of grade point averages, given for groups taught by three different methods in two courses.

Course	*N*	*Mean Gain of Upper 27%*	*S.D. Upper 27%*	*t test*	
Psychology					
Control	10	10.00	1.96	Control vs. Campus	2.39*
Campus TV	10	13.13	3.40	Control vs. At-Home	2.28*
At-Home TV	17	13.63	5.78	Campus vs. At-Home	0.27
Economics					
Control	11	11.34	8.59	Control vs. Campus	1.39
Campus TV	6	16.65	5.95	Control vs. At-Home	1.14
At-Home TV	11	16.86	12.66	Campus vs. At-Home	0.04

*significant at the 5% level.

Table 24.

t tests of the gains scores in subject matter of students in the lower 27% of their contrast groups with regard to grade point averages, given for groups taught by three different methods in two courses.

Course	*N*	*Mean Gain of Lower 27%*	*S.D. Lower 27%*	*t test*	
Psychology					
Control	10	10.25	1.27	Control vs. Campus	2.73*
Campus TV	10	14.59	4.58	Control vs. At-Home	1.64
At-Home TV	17	11.72	3.15	Campus vs. At-Home	0.56
Economics					
Control	11	12.05	15.79	Control vs. Campus	0.51
Campus TV	6	9.03	7.17	Control vs. At-Home	0.16
At-Home TV	11	11.14	9.26	Campus vs. At-Home	0.49

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*significant at the 5% level.

Again, using grade point average as an indicator of motivation, a hypothesis (Number 8) was tested *that there would be no differences in gains on self-insight among the three groups on the basis of student grade point averages at the beginning of the experiment.*

Critical ratios were obtained for self-insight gains scores of the students who were in the top 27% of their groups on the basis of grade point average. The results for the four courses are shown in Table 25.

An examination of this table indicates that students with high grade point averages did not gain appreciably more self-insight from any one teaching method. The Control group in Economics did do significantly better than the At-Home TV group, but this was the only difference among the groups in all four of the courses. Again, there are no data to show why this one significant difference appeared, but there is not sufficient evidence to reject the null hypothesis. In sum, highly motivated students, as indicated by high grade point averages, did not show differential gains in self-insight when taught by the three methods employed in this study.

Table 25.

t tests of the gains scores in Self-Insight of students in the upper 27% of their contrast groups on the basis of grade point averages, given for groups taught by three different methods in each of four courses.

Course	*N*	*Mean Gain of Upper 27%*	*S.D. Upper 27%*	*t test*	
Psychology					
Control	10	9.16	1.23	Control vs. Campus	0.17
Campus TV	10	8.80	6.36	Control vs. At-Home	0.05
At-Home TV	17	9.09	4.97	Campus vs. At-Home	0.12
Economics					
Control	11	4.60	1.10	Control vs. Campus	0.55
Campus TV	6	7.78	13.04	Control vs. At-Home	3.37*
At-Home TV	11	–0.66	4.82	Campus vs. At-Home	1.40
Basic Communication					
Control	8	15.19	9.63	Control vs. Campus	0.81
Campus TV	7	23.71	4.16	Control vs. At-Home	0.07
At-Home TV	12	16.02	7.83	Campus vs. At-Home	0.87
Creative Arts					
Control	4	24.61	19.89	Control vs. Combined Campus and At-Home TV	0.09
Campus TV & At-Home TV (combined)	6	23.45	15.45		

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*Significant at 5% level.

Table 26.

t tests of the gains scores in Self-Insight of students in the lower 27% of their contrast groups on the basis of grade point averages, given for groups taught by three different methods in each of four courses.

Course	*N*	*Mean Gain of Lower 27%*	*S.D. Lower 27%*	*t test*	
Psychology					
Control	10	10.25	1.62	Control vs. Campus	0.62
Campus TV	10	11.97	8.12	Control vs. At-Home	0.63
At-Home TV	17	9.26	5.97	Campus vs. At-Home	0.88
Economics					
Control	11	4.73	.62	Control vs. Campus	0.76
Campus TV	6	2.29	7.20	Control vs. At-Home	1.49
At-Home TV	11	1.74	6.33	Campus vs. At-Home	0.15
Basic Communication					
Control	8	14.60	5.77	Control vs. Campus	0.11
Campus TV	7	23.82	6.64	Control vs. At-Home	0.80
At-Home TV	12	18.50	6.74	Campus vs. At-Home	0.65
Creative Arts					
Control	4	24.61	7.65		
Campus TV & At-Home TV (combined)	6	23.45	7.79	Control vs. Combined Campus & At- Home	1.68

The converse of this question was answered by taking the self-insight gains scores of students in the lowest 27% of their groups on grade point averages. The results of the critical ratios performed on these scores for the groups taught by various methods in all four of the courses are given in Table 26.

There are no significant differences among groups in any of the courses, as shown in Table 26. This means that there is no indication that students with low grade point averages gained more or less insight when taught by different methods.

Summary. On the basis of the findings in this project it appears that motivation of students, at least as measured by grade point averages, is not a major factor in determining how well they perform when taught by television or regular classroom methods. On subject matter tests, students with high grade point average in the Psychology course did do significantly better when taught in the On-Campus and At-Home television groups than did the students with high grade point averages in the regular classroom. This same finding did not appear in the Economics course. Furthermore, high grade point average students did not gain significantly more self-insight in any of the courses when the teaching methods varied. Except for the On-Campus TV group in Psychology, students with low grade point averages showed equal gains on subject matter tests and self-insight in all courses, where comparisons could be made, regardless of the method by which they were taught.

College Aptitude. Tests such as the American Council on Education Psychological Test and the School and College Ability Test attempt to predict academic success. Theoretically, a student who scores in the upper percentiles on these tests is more likely to do well in his courses than a student whose standing is low. Since such findings are based on the normal classroom situation, it seemed pertinent to ascertain whether or not the students who would be expected to do well (or poorly) in the classroom would perform in the same way when taught by television. To do this it was hypothesized (Number 9) *that there would be no differences in gains in knowledge among the three groups on the basis of student standings on college aptitude measures.* This was done by comparing the groups on a basis of the gains made in the subject matter examinations using only high and low scoring students on the ACE or SCAT measures.

The results of the t tests of subject matter gains of the students in the upper 27% on college aptitude are given for the Psychology and Economics courses in Table 27.

Table 27.

t tests of the gains scores in subject matter of students in the upper 27% of their contrast groups with regard to total scores on the SCAT or ACE test, given for groups taught by three different methods in two courses.

Course	*Test*	*N*	*Mean Gain of Upper 27%*	*S.D. Upper 27%*	*t test*	
Psychology	SCAT					
Control		10	9.86	1.81	Control vs. Campus	3.77**
Campus TV		10	12.76	1.48	Control vs. At-Home	2.40*
At-Home TV		18	12.52	3.86	Campus vs. At-Home	0.23
Economics	ACE					
Control		10	7.66	7.53	Control vs. Campus	2.54*
Campus TV		6	16.77	5.76	Control vs. At-Home	1.24
At-Home TV		10	11.96	7.18	Campus vs. At-Home	1.37

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*significant at the 5% level.
**significant at the 1% level.

The results reported in Table 27 show that in Psychology students with high college aptitude scores did significantly better in both of the television groups than in the regular classroom group. In the Economics course the On-Campus TV group did significantly better than the regular class. In neither course were there significant differences between the two television groups.

A similar determination was made for low college aptitude students in each of the groups. The results of these t tests for differential gains are presented in Table 28.

An examination of this table shows that in the Psychology course, again, the two television groups did significantly better than the regular classroom group. No significant differences appeared in the Economics course.

These findings are not easy to interpret. It should be pointed out again that the regular classroom Psychology course was conducted by "group process" methods where the major purpose was to help students see the personal meaning of psychological knowledge rather than to amass "course content." Since the television medium does not seem to be adaptable to such techniques, the knowledge or content emphasis of the broadcasts might have been much higher. If this is true, it may explain why both the high and low aptitude students scored better in the television sections of the Psychology course. It would not explain why the high college aptitude students did better by television teaching in Economics while the low aptitude did not. The high aptitude group in Economics which showed the greatest gains was the On-Campus TV group. The On-Campus TV groups, it will be recalled, had a discussion leader different from the TV instructor. While this may have been a factor, there was no attempt made to control the instructor variable and hence we have no basis for determining its influence.

A different measure of student gain which might well be influenced by college aptitude is self-insight. It was hypothesized (Number 10) *that there would be no differences in gains on self-insight among the three groups on the basis of student standings on college aptitude measures.* This was tested by an analysis of variance or t test of the differences among groups in the various courses. Table 29 shows the results when the gains in self-insight of students in the upper 27% of their group on college aptitude were compared among groups in all four courses.

Table 28.

t tests of the gains scores in subject matter of students in the lower 27% of their contrast groups with regard to total scores on the SCAT or ACE test given for groups taught by three different methods in two courses.

Course	*Test*	*N*	*Mean Gain of Lower 27%*	*S.D. Lower 27%*	*t test*	
Psychology	SCAT					
Control		10	10.73	1.35	Control vs. Campus	3.29**
Campus TV		10	17.88	6.39	Control vs. At-Home	2.82**
At-Home TV		18	14.31	4.91	Campus vs. At-Home	1.46
Economics	ACE					
Control		10	20.25	20.10	Control vs. Campus	1.50
Campus TV		6	7.83	10.90	Control vs. At-Home	0.52
At-Home TV		10	16.62	5.36	Campus vs. At-Home	1.69

**significant at the 1% level.

Table 29.

Tests of gains scores in Self-Insight of students in the upper 27% of their contrast groups with regard to total scores on the SCAT or ACE test, given for groups taught by three different methods for each of four courses.

Course	*Test*	*N*	*Mean Gain of Upper 27%*	*S.D. Upper 27%*	*Test*	
Psychology	SCAT					
Control		9	9.52	1.33	F ratio	.82
Campus TV		9	10.00	6.81		
At-Home TV		18	7.69	2.23		
Economics	ACE				t tests	
Control		10	4.67	.54	Control vs. Campus	.25
Campus TV		6	6.23	13.87	Control vs. At-Home	4.91*
At-Home TV		9	–1.57	3.57	Campus vs. At-Home	1.23
Basic Communication	SCAT					
Control		7	15.68	24.76	F ratio	1.03
Campus TV		7	22.82	14.49		
At-Home TV		7	4.14	27.02		
Creative Arts	SCAT				t test	
Control		5	20.66	24.67	Control vs. Combined	0.10
Campus TV & At-Home TV (combined)		6	22.09	15.50		

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*significant at the 5% level.

This table shows that a significant difference appeared only in the comparison between the Control and the At-Home TV group in Economics. It is not known why this difference appeared, especially since none of the other comparisons in any of the other courses reached significance. It is not possible on the basis of this evidence to reject the null hypothesis. This is interpreted as meaning that students with high college aptitude gained approximately the same in self-insight regardless of the three methods by which they were taught.

A comparison of the students in the lower 27% of their groups on college aptitude is given in Table 30. Since none of the tests in the last column of this table is significant, it is evident that gains in self-insight for students with low scores on college aptitude are similar for television teaching and regular classroom teaching.

Table 30.

Tests of gains scores in Self-Insight of students in the lower 27% of their contrast groups with regard to total scores on the SCAT or ACE test, given for groups taught by three different methods in each of four courses.

Course	*Test*	*N*	*Mean Gain of Lower 27%*	*S.D. Lower 27%*	*t test*	
Psychology	SCAT					
Control		10	8.82	1.59	Control vs. Campus	.06
Campus TV		10	8.65	8.58	Control vs. At-Home	.29
At-Home TV		18	8.34	6.36	Campus vs. At-Home	.10
Economics	ACE					
Control		10	4.75	.84	Control vs. Campus	.52
Campus TV		6	6.67	8.19	Control vs. At-Home	.79
At-Home TV		9	2.95	6.39	Campus vs. At-Home	.87
Basic Communication	SCAT					
Control		7	28.38	29.55	F ratio	.23
Campus TV		7	33.43	36.70		
At-Home TV		7	22.13	17.25		
Creative Arts	SCAT					
Control		5	23.76	22.86	Control vs. Combined	.57
Campus TV & At-Home TV (combined)		6	31.13	13.78		

Summary. The investigation of differences in college aptitude upon the learning of the contrast groups in this study indicates that television teaching is at least as effective as the regular classroom in bringing about gains in knowledge and self-insight. With regard to gains in knowledge, students with high college aptitude taught by television tended to gain significantly more than those in the regular classroom. Students with low college aptitude showed comparable gains in knowledge regardless of the method by which they were taught in this project. With regard to gains in self-insight, neither high nor low college aptitude was associated with superiority on this variable in the comparisons made among contrast groups.

Auding Ability. Since a polished television performance frequently makes less use of redundancy and does not allow for questions where students may have missed some point, it seemed reasonable to determine whether or not auding ability would influence performance outcome. It was hypothesized (Number 11) *that there would be no difference in gains in knowledge among the three groups on the basis of student scores on auding ability.*

A procedure similar to the one discussed with regard to grade point averages and college aptitude was used. The subject matter test gains scores of students who scored in the upper and lower 27% of their groups on the Auding Test were subjected to an analysis of variance to determine the significance of any differences. The results of this analysis for the upper 27% for the three groups of the Psychology and Economics courses are given in Table 31. The results for students scoring in the lower 27% of auding are given in Table 32.

Table 31.

Analyses of variance of gains scores in subject matter of students in the upper 27% of their contrast groups based on auding ability, given for groups taught by three different methods for two courses.

Course	N	Mean Gain of Upper 27%	S.D. Upper 27%	F ratio
Psychology				
Control	9	10.20	2.08	2.34
Campus TV	9	13.01	2.76	
At-Home TV	18	11.67	1.43	
Economics				
Control	7	10.37	8.47	.80
Campus TV	7	18.05	19.62	
At-Home TV	14	17.24	5.57	

Neither of these tables shows any differences which were statistically significant. It would seem, then, that differences in auding ability do not influence gains in knowledge when television groups are compared to groups in regular classrooms.

Table 32.

Analyses of variance of gains scores in subject matter of students in the lower 27% of their contrast groups with regard to auding ability, given for groups taught by three different methods for two courses.

Course	N	Mean Gain of Lower 27%	S.D. Lower 27%	F ratio
Psychology				
Control	9	10.04	1.56	1.26
Campus TV	9	14.18	3.23	
At-Home TV	18	12.58	8.37	
Economics				
Control	11	16.49	13.61	1.06
Campus TV	7	8.92	9.99†	
At-Home TV	10	15.04	7.98	

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†The standard deviation is larger than the mean in this case because these are gains scores and some students actually scored lower on the post-test and therefore had negative gains.

By similar reasoning, auding ability might be related to gains in self-insight. It was hypothesized (Number 12) that *there would be no difference in gains on self-insight among the three groups on the basis of student scores on auding ability.* This was tested by an analysis of variance of the differences among the groups in each of the four courses. Table 33 shows the outcomes when the gains in self-insight of students in the upper 27% of their group on auding ability were compared among groups. Table 34 shows the results when students in the lower 27% were compared.

Table 33.

Analyses of variance of gains scores in Self-Insight of students in the upper 27% of their contrast groups with regard to auding ability, given for groups taught by three different methods for each of four courses.

Course	N	Mean Gain of Upper 27%	S.D. Upper 27%	F ratio
Psychology				
Control	9	9.28	1.83	1.18
Campus TV	9	12.56	5.56	
At-Home TV	18	8.70	7.28	
Economics				
Control	11	4.44	.77	1.73
Campus TV	6	2.88	8.89	
At-Home TV	11	—0.08	5.65	
Basic Communication				
Control	7	9.12	21.27	0.80
Campus TV	7	22.86	17.59	
At-Home TV	7	18.76	18.81	
Creative Arts				
Control	7	14.42	22.75	1.81
Campus TV & At-Home TV (combined)	7	17.92	13.59	

Table 34.

Analyses of variance of gains scores in Self-Insight of students in the lower 27% of their contrast groups with regard to auding ability, given for groups taught by three different methods for each of four courses.

Course	N	Mean Gain of Lower 27%	S.D. Lower 27%	F ratio
Psychology				
Control	10	10.16	8.04	0.90
Campus TV	10	9.63	1.58	
At-Home TV	18	10.63	6.50	
Economics				
Control	11	4.44	0.56	2.92
Campus TV	6	2.44	3.19	
At-Home TV	11	—0.40	6.69	
Basic Communication				
Control	7	25.20	25.43	0.51
Campus TV	7	18.84	7.83	
At-Home TV	7	28.63	12.85	
Creative Arts				
Control	7	29.52	10.00	0.22
Campus TV & At-Home TV (combined)	7	28.84	14.41	

Summary. Since these tables do not show any significant differences, it appears that gains in self-insight were not related to auding ability when comparable groups were taught by the different methods used in this study.

Students with high auding scores made comparable gains, both in knowledge and self-insight, when comparisons were made among groups taught by the two television methods and in the regular classroom. These same results showed up in the comparisons of students with low auding ability. This is interpreted to mean that neither high nor low auding ability affected differentially the performance of students in the three contrast groups.

Achievement Need. As previously described, the Edwards' Personal Preference Schedule gives scores on 15 variables which are given names according to the needs which they presumably measure. Theoretically high or low scores on any of these variables might be significantly related to performance in courses taught by different methods. On the basis of *a priori* assumptions, the relation of a number of these needs to performance might well be explored. The one most obviously related to the present study seemed to be that of achievement need, since different teaching methods could well satisfy this need differentially. Were this the case, it should be reflected in performance. It was hypothesized (Number 13) *that there would be no differences in gains in knowledge among the three groups on the basis of student scores on the "need to achieve," as measured by a personality test.* Students in the upper and lower 27% of their groups on achievement need were compared on subject matter test gains by analysis of variance. The results of this analysis for the Psychology and Economics courses are shown in Tables 35 and 36.

Table 35.

Analyses of variance for gains scores in subject matter of students in the upper 27% of their contrast groups based on the Achievement score on the Edwards' PPS, given for groups taught by three different methods for two courses.

Course	N	Mean Gain of Upper 27%	S.D. Upper 27%	F ratio
Psychology				
Control	9	11.14	1.72	3.09
Campus TV	9	13.83	2.85	
At-Home TV	18	11.20	3.09	
Economics				
Control	7	11.80	9.60	0.20
Campus TV	7	13.47	5.24	
At-Home TV	14	11.41	5.37	

Table 36.

Analyses of variance for gains scores in subject matter of students in the lower 27% of their contrast groups based on the Achievement score on the Edwards' PPS, given for groups taught by three different methods for two courses.

Course	N	Mean Gain of Lower 27%	S.D. Lower 27%	F ratio
Psychology				
Control	9	9.89	0.92	3.48*
Campus TV	9	14.80	5.73	
At-Home TV	18	14.51	4.22	
Economics				
Control	7	17.35	19.36	0.20
Campus TV	7	17.04	7.86	
At-Home TV	14	13.50	14.18	

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*significant at the 5% level.

From Table 35 it can be seen that students with high scores on need to achieve did not differ significantly in their gains in either the Psychology or Economics courses. Table 36, based upon the lower 27% on achievement need, shows that in Psychology the students in both the On-Campus TV and the At-Home TV groups gained significantly more than the regular classroom students. This somewhat surprising finding suggests that television teaching may provide special stimulation for students with low achievement needs. However, no significant differences appear among the students with low achievement needs in the Economics groups. Despite the finding for the students with low achievement needs in the television sections of Psychology, it does not seem reasonable to conclude that either high or low achievement needs clearly influence performance when method of teaching is varied.

The relation of achievement need to gains in self-insight was similarly explored. It was hypothesized (Number 14) *that there would be no differences in gains on self-insight among the three groups on the basis of student scores on the "need to achieve," as measured by a personality test.* Students in the upper and lower 27% of their groups on achievement need were compared on gains in Self-Insight scores by analy-

Table 37.

Analyses of variance for gains scores in Self-Insight of students in the upper 27% of their contrast groups with regard to the Achievement score on the Edwards' PPS, given for groups taught by three different methods in each of four courses.

Course	N	Mean Gain of Upper 27%	S.D. Upper 27%	F ratio
Psychology				
Control	9	9.01	1.82	0.65
Campus TV	9	9.82	6.38	
At-Home TV	18	7.77	3.68	
Economics				
Control	11	4.36	0.49	7.41**
Campus TV	6	4.12	5.54	
At-Home TV	11	—2.91	5.99	
Basic Communication				
Control	7	21.42	25.99	0.06
Campus TV	7	25.34	15.87	
At-Home TV	7	23.75	15.89	
Creative Arts				
Control	7	24.77	19.13	6.60**
Campus TV & At-Home TV (combined)	7	11.17	8.71	

**significant at the 1% level.

Table 38.

Analyses of variance for gains scores in Self-Insight of students in the lower 27% of their contrast groups with regard to the Achievement scores on the Edwards' PPS, given for groups taught by three different methods in each of four courses.

Course	N	Mean Gain of Lower 27%	S.D. Lower 27%	F ratio
Psychology				
Control	9	10.77	1.64	2.54
Campus TV	9	13.37	5.17	
At-Home TV	18	8.62	5.91	
Economics				
Control	11	4.69	.77	3.13
Campus TV	6	8.83	9.54	
At-Home TV	11	—0.84	9.61	
Basic Communication				
Control	7	14.94	22.63	0.09
Campus TV	7	12.25	14.45	
At-Home TV	7	18.16	31.15	
Creative Arts				
Control	7	10.32	23.40	4.70**
Campus TV & At-Home TV (combined)	7	20.37	12.21	

**significant at the 1% level.

sis of variance. The results of these analyses for the groups in all four of the courses are given in Tables 37 and 38.

An examination of Table 37 shows that there were no differences among the groups in Psychology and Basic Communication. In Economics and Creative Arts there were significant differences among the groups. Both the Control and the On-Campus TV groups with high achievement need gained significantly more on self-insight than did the At-Home TV group. In the Creative Arts course, the At-Home and On-Campus TV groups were combined (because of the small number of students) and the Control group gained significantly more than this combined group.

Table 38, which is a similar comparison among subgroups with low achievement need, shows no significant differences among the groups in Psychology, Economics or Basic Communication. A significant difference is found again in the Creative Arts, in a reverse direction. Where in Table 37 the high achievement need group did better in the regular classroom, Table 38 shows that the low achievement need group did better in the combined On-Campus and At-Home TV group.

Summary. No pattern emerged from the data on achievement need to indicate a systematic influence of this variable in the study. The Creative Arts groups with high need for achievement did definitely better in the regular classroom and the ones with low need for achievement did definitely better by television. In all courses the findings varied. Therefore, it must be concluded that there is no clear-cut indication that the need to achieve, as measured by the Edwards' PPS, is related to performance of the contrast groups in this study.

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V. Results of the Research (Part 2)

Chapter IV has reported the findings of this study which showed that various groups within each course were comparable; it presented the results of comparisons between these groups on a number of variables; and it gave the results of attempts to isolate factors which might affect performance of students when instruction did or did not include the use of television. In this chapter further findings will be presented which are of a somewhat different character.

Educators are convinced that in most classes student changes occur which are not reflected in the usual measures which are strictly concerned with increases in knowledge and skills. These changes lie in the area of feelings and attitudes and, while the evidence is not clear, may well be better indicators of the persistence of learning than the more immediate outcomes. In the following sections these findings will be discussed. The first section will deal with the sociometric results of the various kinds of class groupings used in television and non-television teaching. The final section will report the attitudes of students toward television instruction.

Sociometric measures. The decreased association with fellow students is very marked when students are viewing television lectures at home. It is not as marked when students watch a broadcast together in a classroom, but interaction is still less than in most regular classes where there is some discussion. In both of the television situations the students have personal contact with an instructor only one third as often as usual. Both of these points are particularly relevant in connection with the General Education courses selected for this project since class size is normally and intentionally kept small (less than 45 students) for most courses. To determine the effects of television use in this project a hypothesis (Number 5) was tested *that there would be no differences in the sociometric relations at the end of the course among the three groups taught by different methods.*

Sociometric data were gathered from all classes at the beginning and the end of the semester in order to *quantify* any differences introduced by television. Each student was given a list of all his classmates and asked to rate them on a six point scale indicating his feelings toward each person, but crossing out the names of any he did not know. Initially, no significant differences existed among contrast groups in any course.

A chi square test was made to see whether or not there were differences among the contrast groups in the number of students known by their fellow students at the end of the semester. The results of this test are shown in Table 39.

Table 39.

Chi square of the differences in average number of students known in each of the groups for each of the four courses at the end of the semester.

Course	N	Known	%	Unknown	%	X^2
Psychology						
Control	35	33.79	97	1.21	3	30.99**
Campus TV	35	29.40	84	5.60	16	
At-Home TV I	33	16.21	49	16.79	51	
At-Home TV II	31	13.88	45	17.12	55	
Economics						
Control	43	21.35	50	21.65	50	6.19
Campus TV	31	6.74	22	24.26	78	
At-Home TV I	25	10.90	44	14.10	56	
At Home TV II	23	9.94	43	13.06	57	
Basic Communication						
Control	27	25.12	93	1.88	7	6.59
Campus TV	30	19.63	65	10.37	35	
At-Home TV I	18	13.45	75	4.55	25	
At-Home TV II	21	14.59	70	6.41	30	
Creative Arts						
Control	27	17.29	64	9.71	36	3.67
Campus TV	21	8.41	40	12.59	60	
At-Home TV	8	2.89	36	5.11	64	

** significant at the 1% level.

An examination of Table 39 shows that the average proportion of a class known to students in the class was greater in all courses for the Control groups than for the television groups. The difference is very great in a comparison between the Control groups and the At-Home TV groups. Only in the Psychology course did the overall chi square for all groups in a course reach significance. Here again, one must be aware of the "group process" techniques used in this course which stress pupil-pupil interaction. Television teaching is less equivalent to this method than it is to the lecture, panel discussion, and demonstration techniques used in the other courses. Another factor which must be noted is that, with the exception of the Basic Communication On-Campus TV group, in each course the Control section was the largest section and therefore presented these students with a more difficult situation in which to become acquainted.

Summary. The evidence here seems to indicate that students do not get to know each other as well when a majority of the teaching is done by television. The hypothesis that there would be no differences among the groups must be rejected with regard to the Psychology course and is certainly in doubt with regard to the other courses.

Attitudes. The contrasting situation which students faced in television and non-television courses would naturally invoke feelings. Major differences lie in the newness of the method, the lack of direct contact with the instructor, and the impossibility in the telesession of participating in discussion and raising questions. The effects of these changes were investigated by testing the hypothesis (Number 6) *that there would be no differences at the end of the course in attitudes of students toward their own learning experience and television courses among the three groups taught by different methods.*

Each student filled out reaction sheets at the end of the course concerning his feelings about the television course and the specific experience which he had just completed. (Appendix *D*). The Control groups answered the same questions as the On-Campus TV and At-Home TV groups, even though they had not had any television courses. The reaction sheet had three questions: one concerning the student's general reaction to a telecourse, another asking if he would take a telecourse next semester if offered the opportunity, and finally, a check list for the student to indicate specific deficiencies which he felt had existed in his particular experience the past semester.

Table 40 gives the results from tallying the answers to the first question in which students marked their reactions to television courses on a five point scale from "dislike it very much," to "extremely enthusiastic about it." For ease of comparison the results are given in percentages.

An inspection of this table shows clearly that participation in a television class affected the attitudes of the students toward television teaching. In all courses the students taking a course by the usual methods tended to prefer this method and to feel negative toward television teaching. The students who participated in an On-Campus TV group seemed to respond in a manner which was very similar to the students in regular classrooms. On the other hand, the students who took the television course at home were much more favorable toward television teaching. In the Psychology course, a larger percentage of students preferred or were enthusiastic about television than disliked television or preferred the regular classroom.

Table 40.

Percentages of student responses falling in various categories showing their preferences for TV teaching or regular classroom methods, given for all groups for each of the four courses.

Course	N	Dislike TV %	Prefer Classroom %	TV Satisfactory %	Prefer TV %	TV Enthusiast %
Psychology						
Control	29	24	24	34	3	14
Campus TV	37	16	43	32	3	5
At-Home TV	50	8	18	34	24	16
Economics						
Control	24	17	33	46	4	0
Campus TV	33	39	36	15	6	3
At-Home TV	41	12	46	32	2	7
Basic Communication						
Control	19	5	58	26	0	11
Campus TV	24	12	71	17	0	0
At-Home TV	29	10	17	52	10	10
Creative Arts						
Control	25	16	52	24	8	0
†Campus and At-Home TV	24	8	38	29	12	13

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†Because of the small size of the groups, the On-Campus and At-Home TV groups were combined.

A further breakdown was made by courses and groups within courses, and the differences of expressed preferences were tested for significance by means of a chi square test. The results of this analysis are shown in Table 41.

Table 41 bears out the general statements made about the percentage figures shown in Table 40. In the Psychology and Basic Communication courses the overall chi square showed that significant differences did exist among the groups. In both of these courses there were no significant differences in preferences between the Control and the On-Campus TV groups. There were, however, significant differences between the On-Campus TV and the At-Home TV groups. In Basic Communication there was also a significant difference between the preferences of the Control and At-Home TV groups at the 5% level. This difference did not appear between the Psychology Control and At-Home TV groups although the chi square approached significance at the 5% level. No significant differences showed up among any of the groups in the Economics or Creative Arts courses.

Without additional data it is only possible to speculate as to why differences showed up in two of the courses and did not show up in the other two. The Economics course was a straight lecture course both on TV and in the classroom, whereas the TV presentations of Psychology and Basic Communication were quite different from the classroom course.

The TV course in Creative Arts was also different from the regular campus presentation. No significant difference emerged between the Control and Combined TV groups, perhaps because of the small number of students involved. As regards student attitudes toward telecourses, these data suggest the possibility that the lecture technique is not as well adapted to home TV viewing as are some of the techniques used in the Psychology or Basic Communication courses.

The second question asked on the reaction sheet was, "If a course you needed were being offered by television next semester, with which of the following groups would you sign up?" Three choices were given for the students to select from, "TV At-Home," "TV On-Campus," and "Regular Campus Class." Table 42 shows the percentages in the various groups and courses selecting each of the alternatives.

Table 41.

Chi square test of the differences in number of student responses falling in various categories indicating their preferences for TV or regular classrom teaching for each of four courses.

Course	N	Dislike TV	Prefer Classroom	TV Satisfactory	Prefer TV	TV Enthusiast	X^2
Psychology							
Control	29	7	7	10	1	4	
Campus TV	37	6	16	12	1	4	
At-Home TV	50	4	9	17	12	8	21.00**
Control vs. On-Campus TV							3.59
Control vs. At-Home TV							8.86
On-Campus vs. At-Home TV							14.52**
Economics							
Control	24	4	8	11	1	0	
Campus TV	33	13	12	5	2	1	
At-Home TV	41	5	19	13	1	3	14.61
Control vs. On-Campus TV							8.08
Control vs. At-Home TV							3.59
On-Campus vs. At-Home TV							9.39
Basic Communication							
Control	19	1	11	5	0	2	
Campus TV	24	3	17	4	0	0	
At-Home TV	29	3	5	15	3	3	21.87**
Control vs. On-Campus TV							9.92*
Control vs. At-Home TV							18.79**
On-Campus TV vs. At-Home TV							10.78**
Creative Arts							
Control	25	4	13	6	2	0	
†Campus and At-Home TV	24	2	9	7	3	3	4.53

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*significant at the 5% level.

**significant at the 1% level.

†Because of the small size of the groups, the On-Campus and At-Home groups were combined.

Table 42.

Percentages of students selecting At-Home TV, On-Campus TV, or regular classroom if taking a course next semester, given for all groups in all courses.

Course	N	At-Home TV %	On-Campus TV %	Regular Campus Class %
Psychology				
Control	36	6	14	81
On-Campus TV	37	27	8	65
At-Home TV	50	48	12	40
Economics				
Control	34	9	3	88
On-Campus TV	33	6	21	73
At-Home TV	36	28	0	72
Basic Communication				
Control	25	4	8	88
On-Campus TV	22	5	5	91
At-Home TV	29	45	7	48
Creative Arts				
Control	26	15	4	81
†All TV	24	25	21	54

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†Because of the small size of the groups, the On-Campus and At-Home TV groups were combined.

An inspection of this Table shows results very similar to those in Table 40. Participation in a television course apparently does influence student attitudes about the desirability of such courses. Once again it is clear that students who participated in an At-Home course were much more willing to take another course by At-Home television than were the On-Campus TV groups or the regular classroom groups. It is important to note that in all groups with the exception of the Psychology At-Home TV group, the majority of the students still preferred regular campus classes to either kind of TV class.

These results were also analyzed by use of chi square to test for the significance of differences, and the results are given in Table 43.

Table 43 shows that with the exception of the Creative Arts course, where it was necessary to combine the television groups, there were significant differences among groups in all of the courses. In the further breakdown of groups within courses the results varied in different courses. In the Psycholgy courses, both the On-Campus and At-Home TV sections changed in a direction of being more favorable toward At-Home TV and they differed significantly from the Control group. In the Economics course, each of the TV groups, although preferring a regular campus class, moved in the direction of choosing the method through which they had

Table 43.

Chi square test of the differences in number of students selecting At-Home TV, On-Campus TV, or regular classroom if taking a course next semester for each of four courses.

Group	N	At-Home TV	On-Campus TV	Regular Campus Class	
Psychology					
Control	36	2	5	29	
On-Campus TV	37	10	3	24	
At-Home TV	50	24	6	20	22.73**
Control vs. On-Campus TV					6.31*
Control vs. At-Home TV					18.63**
On-Campus TV vs. At-Home TV					5.34
Economics					
Control	34	3	1	30	
On-Campus TV	33	2	7	24	
At-Home TV	36	10	0	26	18.83**
Control vs. On-Campus TV					6.47*
Control vs. At-Home TV					4.91
On-Campus TV vs. At-Home TV					12.42**
Basic Communication					
Control	25	1	2	22	
On-Campus TV	22	1	1	20	
At-Home TV	29	13	2	14	19.51**
Control vs. On-Campus TV					.24
Control vs. At-Home TV					11.83**
On-Campus TV vs. At-Home TV					10.78**
Creative Arts					
Control	26	4	1	21	
†All TV	24	6	5	13	4.80

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*significant at the 5% level.
**significant at the 1% level.
†Because of the small size of the groups, the On-Campus and At-Home groups were combined.

been taught during the project. These differences are significant except in the comparison between the Control and At-Home TV groups, where it approached significance. In the Basic Communication course, only the At-Home TV group moved to significantly more favorable attitudes toward TV, but only toward At-Home TV.

Again, the specific differences between courses cannot be explained without additional data. The At-Home TV situation seems to be a much more attractive form of television to students in all courses except the Economics courses. Here it might be suggested that if the teaching technique is primarily one of lecture, it really doesn't make much difference whether one is listening at home or in a classroom.

The third section of the reaction sheet asked the students to check items which they felt were deficiencies in the course they had just finished. It should be noted again that the Control group in each course had not had any experience with a television course and were checking on the basis of a regular classroom course.

The number of critical comments was tallied for each of the groups in each of the courses. Table 44 gives the results of this tally with a column showing the average number of comments per person. With the exception of the Creative Arts groups, where the two TV groups were combined because of the small numbers of students, the pattern is consistent. Students in the regular classroom in the Psychology, Economics and Basic Communications courses had the fewest number of critical comments to make about the course. Students in the On-Campus TV groups in these same courses had the greatest number of critical comments to offer.

Table 44.

Distribution of critical comments about the course among groups taught by three methods given for each one of four courses.

Course	N	Number of Comments	Average per Person
Psychology			
Control	36	30	.83
Campus TV	37	112	3.03
At-Home TV	61	87	1.43
Economics			
Control	40	66	1.65
Campus TV	33	99	3.00
At-Home TV	50	111	2.22
Basic Communication			
Control	25	18	.68
Campus TV	24	60	2.50
At-Home TV	29	52	1.79
Creative Arts			
Control	24	56	2.33
Campus TV & At-Home TV (combined)	28	61	2.18

A breakdown of the percentages of students checking each of the critical comments is given for each of the groups for each of the courses in Tables 45, 46, 47 and 48. The results for the Creative Arts course are not really comparable as these students had four different instructors and there were many problems involved in coordinating this course. The only clearcut and consistent difference among groups here was on the first item, with students feeling that they did not have enough personal contact with the instructor in the television groups. The only other generalizations these data support is a greater tendency for the television groups to see the subject matter as dull and some tendency in the Economics and Basic Communication course for the television groups to think the course had less organization. The other responses represent so few people or are distributed among the groups in such a way as to lack significance for understanding the differential effects of television and non-television courses.

Table 45.

Percentage of students checking each of the critical comments for groups taught by three different methods in Psychology.

Comments	Control N = 36 %	Campus TV N = 37 %	At-Home TV N = 61 %
1. Lack personal contact	17	89	67
2. Subject matter dull	0	21	10
3. Too much reading	3	5	5
4. Lack of organization	28	38	18
5. Content not important	17	11	0
6. Presentation too elementary	0	5	3
7. Material too technical	0	14	2
8. Classroom too casual	14	68	11
9. Poor use of audio-visual aids	0	5	7
10. Content not practical	0	8	3
11. Other	6	38	8

Table 46.

Percentage of students checking each of the critical comments for groups taught by three different methods in Economics.

Comments	Control N = 40 %	Campus TV N = 33 %	At-Home TV N = 50 %
1. Lack personal contact	30	89	60
2. Subject matter dull	18	24	30
3. Too much reading	33	24	36
4. Lack of organization	10	24	16
5. Content not important	13	24	12
6. Presentation too elementary	0	6	14
7. Material too technical.	18	30	30
8. Classroom too casual	3	15	4
9. Poor use of audio-visual aids	13	18	8
10. Content not practical	8	12	4
11. Other	23	30	8

Table 47.

Percentage of students checking each of the critical comments for groups taught by three different methods in Basic Communication.

Comments	Control N = 25 %	Campus TV N = 24 %	At-Home TV N = 29 %
1. Lack personal contact	20	88	62
2. Subject matter dull	8	50	31
3. Too much reading	0	0	24
4. Lack of organization	4	50	14
5. Content not important	8	4	14
6. Presentation too elementary	4	8	0
7. Material too technical	12	38	3
8. Classroom too casual	0	17	7
9. Poor use of audio-visual aids	8	0	3
10. Content not practical	8	29	14
11. Other	0	8	7

Table 48.

Percentage of students checking each of the critical comments for groups taught by three different methods in Creative Arts.

Comments	Control N = 24 %	Campus TV N = 20 %	At-Home TV N = 8 %
1. Lack personal contact	50	55	67
2. Subject matter dull	17	25	13
3. Too much reading	4	10	0
4. Lack of organization	79	40	38
5. Content not important	21	5	38
6. Presentation too elementary	21	15	0
7. Material too technical	13	10	13
8. Classroom too casual	4	5	13
9. Poor use of audio-visual aids	8	20	25
10. Content not practical	17	10	13
11. Other	0	0	13

In addition to the reaction sheet given to all students at the end of the experimental semester, a more complete attitude questionnaire was devised and administered to the students in the Psychology course by a psychology graduate student.[1] The results appear in Table 49. The data were gathered approximately three months after the students had completed their participation in the Television Project. 91% of the students in the experimental Psychology classes completed and returned the questionnaire. There were ten questions, some of which overlapped with data already reported. In the case of each question, a chi square test was made to determine significant differences among the groups being taught by three different methods. Since these data tend to corroborate those gathered earlier only a general summary of the findings will be given here.

With the exception of answers to one question, about taking a TV course next year, the Control and At-Home TV groups were very similar. On this question, the At-Home TV group was significantly more favorable than either the Control or the On-Campus TV group. The Control and At-Home TV groups also indicated significantly more enjoyment of the course than did the On-Campus group. The At-Home TV group was also significantly different from the On-Campus

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—[1] The writers wish to express their appreciation to Mr. LeRoy Farmer for making available to them the results of his follow-up study on students in the Psychology course of the TV Project.

Table 49.

Questionnaire follow-up of the contrast groups in Psychology during the semester after their participation in the TV Project. The content of each question is given to the left below, and significant differences in the responses of the contrast groups are indicated in the columns to the right. All questions were answered on a five-point scale, and the data tested by chi square.

Content of Question	*Differential Responses of Contrast Groups*			
	At-Home TV more than Campus TV	Control more than Campus TV	Control more than At-Home TV	At-Home TV more than Control
1. Enjoy Psychology as much as other classes?	x	x		
2. Profit in terms of intellectual growth?	x			
3. Gain in understanding of self and/or others?	No significant differences among the contrast groups.			
4. Television instruction as beneficial as regular instruction on campus?	x			
5. Ample time to discuss material presented?	x	x	x	
6. Get to know your professor?	x	x	x	
7. Professor concerned about arousing your interest in the material?	No significant differences among the contrast groups.			
8. Like being in a class that was part of an experimental study?	No significant differences among the contrast groups.			
9. Satisfied with grade for course?	x			
10. Willing to take a required G.E. course by television next year?	x			x

group in feeling that they received more intellectual growth and that students could benefit just as much from TV courses as regular classroom courses. They were also more satisfied with their grades from the course than the On-Campus TV group. The attitudes of the Control group were significantly more positive toward the amount of class discussion time than was the At-Home TV group; but this group was, in turn, significantly more positive than was the On-Campus TV group. The Control group was significantly more satisfied than the At-Home TV group with the opportunity they had to get to know the instructor. Both the Control and At-Home TV groups were more satisfied than the On-Campus TV group in the respect; but it should be remembered that the On-Campus TV group did not have the TV instructor as a discussion leader. This meant that they were dividing their time between two professors. There were no significant differences among the three groups in the degree that the course helped them understand themselves and others, their feelings toward participating in the TV experiment, or their beliefs about the instructors' attempts to make the course interesting.

Generally, it appears that the semester following the Psychology course, the On-Campus TV group was significantly more negative about the whole experience than was either the Control or At-Home TV group. The Control and At-Home TV groups were very similar in the attitudes they expressed. By and large, the At-Home TV group was rather more favorable to television as an instructional medium than the Control group, but both groups were very favorable to the particular experience they had in this course.

Summary: Since the variety of data presented on student attitudes toward telecourses yielded rather different findings for each of the four courses, it is not possible to reject the hypothesis (Number 6) definitely. However, certain clear-cut patterns emerged. There was a noticeable tendency for students in the At-Home television section to react more favorably to this manner of taking a course as a result of their experience, and a counter tendency for students in the On-Campus television groups to be somewhat negative toward their own campus television experience. When students were asked to indicate which of the three types of course presentation they would elect in the future, there was a preponderance of choices favoring a regular campus class. As might be expected from the above data, the most favorable attitudes toward telecourses were from among the At-Home TV groups. With the exception of the Creative Arts course, students in the Control groups made the fewest critical comments about their courses, and students in the On-Campus TV groups were most critical of their courses.

VI. Discussion and Conclusions of the Research Portion of the Project

Before presenting the general conclusions which seem to be warranted by the data presented in the last two chapters, it is necessary to discuss briefly some of the acknowledged limitations of the present study. These are of two general sorts. Some of them are concerned with special factors which have served as guidelines in making interpretations and drawing conclusions in this study. Others are more general problems inherent to any attempt to evaluate educational outcomes.

Limitations of the Present Study

Controls. The overall purpose of this study was to determine whether or not students achieve the objectives of a college course as well when the learning experience includes instruction by television as when instruction is given by the conventional classroom methods. The study was designed to incorporate controls which would make it possible to answer this basic question. It was, unfortunately, impossible to incorporate many other controls which would have made possible more definitive findings on many other aspects of the study. Some of these have been noted in passing when discussing the outcomes in earlier chapters, but further consideration of several of them seems important here.

No attempt was made to control the courses which students took *in addition to* one of the experimental courses. This was not deemed necessary for the overall study since it was safe to assume that outside courses would not be distributed in any one group within a course so as to insert a systematic bias. This assumption does not hold, however, between courses. For example, the gains in self-insight of students in Basic Communication may be related to the experience of students in that course or they may be influenced by the Psychology course which is normally taken at the same time. In all comparisons made between one contrast group and another within the same course it can be presumed that the effects of outside courses were systematically distributed. In the comparisons of the upper and lower 27% among contrast groups this assumption may not hold since the number of students was so small (eight or nine in a group).

The On-Campus TV group in Psychology, Economics and Basic Communication had a discussion leader who was not the same as the television instructor. This deliberate introduction of an instructor variable confounds some of the questions about student attitudes and raises other questions about how compatible the methods of the two instructors were. The instructors who led the discussion groups discuss some of these questions in their reactions to the experimental courses in Chapter VIII.

Each instructor has a style of teaching and preferred techniques in organizing his class. Some of these may be more interfered with by the introduction of television than others. It was not possible to control this without increasing the scope and complexity of the study tremendously. Where possible, it has been taken into account in discussing findings, e.g., the group process techniques used in the Psychology Control class, but the direct effect of instructor techniques has not been assessed.

Interpretation. The considerations just discussed about controls, along with the fact that each of the four courses was different in content and purpose, raised some problems in interpreting the findings. In general, if the findings in two or more of the courses showed significant differences among groups within the course, the null hypothesis being tested was considered of doubtful validity. If only one course showed significant differences among groups this was not considered to be sufficient evidence for rejecting the null hypothesis, unless the trend of the evidence from the other courses strongly suggested a similar direction of finding. In every case where mixed results appeared between courses some attempt has been made to discuss any available data which might clarify the result.

All of the interpretations have been made in relation to the main purpose of the study, i.e., no attempt has been made to interpret differences in magnitude of scores across courses or to find the reasons for differences between courses where the same instruments have been used in both courses. Such discussions would have been highly speculative and would not have shed light on whether or not students can learn as well by television as non-television teaching.

Generality of the findings. The results of this research have clearly valid implications for San Francisco State College and the population from which its students are drawn. It is difficult to say how valid these same findings are for other colleges or other geographical locations. In Chapter I a description was given of the General Education program here, and of the nature of the student body. It should be evident that both the program, with its small classes, and the student body, which is almost completely a commuting group, vary quite markedly from many other colleges.

Some of the findings, such as the one that gains in knowledge are the same regardless of the teaching technique, have been found so generally in other studies that they fit a nationwide pattern. Other findings, such as the differences in attitudes between On-Campus TV groups and At-Home TV, may not hold up or even be applicable in other situations.

In another sense the generality of the findings should also be viewed with caution. Do these findings mean that television is equally useful in all situations and for the purpose of accomplishing all of the goals of a particular course, as normally presented in the classroom? The answer is clearly "No." There is still much to be learned about the types of courses for which television is most appropriate. Courses which depend upon personal participation or personal relations with the instructor present serious problems for television teaching. Perhaps, even more important than this, the learning process itself is not yet well enough understood so that one can say with confidence that any study is measuring all of the important outcomes. Furthermore, the findings in this study are conflicting. If one looks just at the outcomes with regard to increase in knowledge and self-insight, television appears to be as satisfactory as traditional methods. If one looks at the findings with regard to student attitudes, On-Campus TV does not appear to be as satisfactory as the regular classroom.

Problems of Evaluating Learning Outcomes in College Work. Whenever one is faced with the task of comparing two or more methods of presenting a college course, he is led immediately to the fundamental question, what measurable outcomes do appear in students as a result of the learning experiences they have undergone? There are many opinions about the tangibles and intangibles that different teaching methods achieve. These opinions are often strongly buttressed by emotion, but, unfortunately, little research exists which points clearly to any answers. The major problems seem to lie in two areas, the discovery of criteria of learning which discriminate between groups, and the development of instruments which measure these criterion outcomes. Two general criteria are most commonly used: learning is said to take place if there is an increase in knowledge, demonstrated by the student; learning is said to take place if there is some change in the attitudes or values of the student. Even these two criteria are not always easy to separate and they certainly interact.

When knowledge is used as a criterion to discover the differential effects of two teaching methods, the results are disappointing. Birney and McKeachie, summing up the research on the teaching of psychology during the past twelve years, make the following statement:

> "In 1942, Wolfle summarized research up to that time by repeating Longstaff's statement of 1932: 'The experimental evidence submitted to the present time tends to support the general conclusion that there is little difference in achievement in large and small classes, and also, that it makes little difference as to what method of presentation of materials of the course is used.'
>
> "The third decade of research has not outdated Longstaff's statement." (1)

This same finding is applicable to the research on the effects of television teaching which has been conducted to date. On the whole, the contrasts between television teaching and the regular classroom have not revealed significant differences in the achievement of knowledge.

Attitude measures occupy a somewhat different but an equally ambiguous position in the literature of research. Definitions of the term *attitude* and beliefs about the role of attitudes in relation to behavior are controversial topics among psychologists. This does not imply that such findings are useless or should not be sought, but it does raise a question as to how convincing such evidence is as a test of differences attributable to television as a teaching instrument.

Actually, only limited use has been made of attitude measures of this type and so it is not possible to say whether television is more or less effective in changing attitudes. Under the heading of attitudes, most studies have presented questionnaire data gathered at the end of a television course. Inquiries as to whether students liked the course as well or better than a regular course and whether they would take another course by television if they were free to choose, are typical of the questions in such studies. It has been assumed that these measures have a face validity. In a number of cases, significant differences have been found, generally favoring regular courses over telecourses. However, such results leave many variables uncontrolled. Some instructors create a more favorable impression than others, some kinds of subject matter are more amenable to television treatment, etc. Because of these variables, the results from course to course or from student group to student group tend to be unstable.

Clearly we are in desperate need of additional criteria for measuring the effectiveness of various methods of teaching at the college level *generally*. One is led to question gravely the competence of research at this time to answer the most crucial questions about the effectiveness of television as a replacement for the more conventional teaching methods.

The present study has not been able to solve this problem. Time did not permit the development of instruments to tap new and significant dimensions with which to evaluate course outcomes. However, an effort has been made to use a broader base of standarized evaluation instruments than in the majority of studies of instructional television, where performance on course content examinations has typically been the sole basis for comparing groups taught by different methods.

Conclusions

The conclusions which appear to be warranted by the evidence gathered in this study will be presented under numbered headings corresponding to the hypotheses which were veloped in Chapter III.

1. There were no significant differences in the amount of knowledge gained, relevant to the course, among the three groups taught by different methods.

The findings were unequivocal with regard to this. All groups in all courses where this could be tested made significant gains in knowledge between the beginning and end of the course but no contrast group gained significantly more than any other in the same course.

2. There were no differences in the degree of achievement of General Education goals as measured by the course examinations and grades, among the three groups taught by different methods.

With one exception, this finding was also supported in all courses. In Creative Arts one group did score significantly higher than another on the final examination. In all other courses there were no significant differences in the grades assigned to the various groups.

3. There were no significant differences among the groups in any of the courses with regard to gains in self-insight.

4. In general, there were no differences in increases of the feelings of acceptance of self and of seeing other people as self-accepting among the three groups taught by different methods.

The Control Psychology group, taught by "group process" techniques in the classroom, did show significantly greater movement toward self acceptance than was true of either of the television groups. The contrast groups in the other three courses did not show any differential effects on these variables.

5. There were significant differences in the sociometric relations at the end of the course among the three groups taught by different methods.

Without exception, students in the television sections knew fewer of their classmates than students in the Control sections. The students in the On-Campus TV group met together regularly for the same amount of time as the Control group. The At-Home TV met together for only one third as much time. In all cases the At-Home TV groups were smaller, one group being less than one third as large as the Control group, and still they knew a smaller proportion of their classmates.

6. There were significant differences among the contrast groups at the end of the courses in student attitudes toward their own learning experience and toward television courses generally.

In Psychology and Basic Communication, the On-Campus TV groups were significantly less enthusiastic about television instruction than were the At-Home TV groups. A similar trend appeared in the other courses. With the exception of the Psychology At-Home TV group, the largest percentage of students in all groups, in all courses, expressed preference for a regular class if they had a choice between that and a television course the following semester. The largest percentage of the Psychology At-Home TV group expressed a preference for another At-Home TV course. In the other At-Home TV groups, a telecourse taken at home was preferred by the second largest percentage of students.

In all courses the On-Campus TV groups had the most critical comments to make about their learning experience and the Control groups had the least number of critical comments. Television students in both the On-Campus and At-Home groups were more critical of the lack of contact with the instructor and tended to find their course duller than the Control groups.

7. In general, there were no differences in gains in knowledge among the three groups on the basis of student grade point averages at the beginning of the experiment.

Student grade point averages were used as an indicator of student motivation. Students in the upper 27% of their group with regard to grade point average did do significantly better on the subject matter examination in both the On-Campus and At-Home TV groups in Psychology. The same trend appeared in the Economics course but was not significant. Students in the lower 27% of the Psychology On-Campus TV group also did significantly better than the Control group. None of these differences appeared in the other courses. This fact, plus the small number of cases involved when one takes 27%, makes it extremely doubtful that these differences offer sufficient evidence for concluding that motivation, as measured by grade point average, is a significant factor influencing gaining knowledge by television.

8. In general, there were no differences in gains on self-insight among the three groups on the basis of student grade point averages at the beginning of the experiment.

Students in the upper 27% of their group with regard to grade point average did gain significantly more on self-insight in the Economics Control group than in the At-Home TV group. No other differences appeared among the groups in any of the other courses.

9. There were significant differences in gains in knowledge among the three groups on the basis of student standings on college aptitude measures.

In Psychology the students who scored high on college aptitude did significantly better in both of the television groups than in the Control group. In Economics the On-Campus TV group students who scored high on College aptitude did significantly better than the Control group. Among students who scored low on the college aptitude test, the two television groups in Psychology did significantly better on the subject matter test than did the Control group. No differences appeared among the low aptitude students in Economics.

10. There were no differences in gains on self-insight among the three groups on the basis of student standings on college aptitude measures.

Students who scored high on college aptitude showed significantly greater gains in self-insight in the Economics Control group than in the At-Home TV group. No differences appeared between any of the other groups in Economics and none appeared among any of the Psychology groups. No differences occurred among any of the groups in either course with regard to low college aptitude scores.

11. There were no differences in gains in knowledge among the three groups on the basis of student scores on auding ability.

No significant differences on the subject matter test occured in any of the groups in any of the courses on the basis of either high or low auding ability.

12. There were no differences in gains on self-insight among the three groups on the basis of student scores on auding ability.

No significant differences on the self-insight test showed up among any of the groups in any of the courses on the basis of either high or low auding ability.

13. There were no differences in gains in knowledge among the three groups on the basis of student scores on the "need to achieve," as measured by a personality test.

Students who scored high on the need to achieve did not differ significantly in their scores on the subject matter test among the three groups in either course. Students who scored low on need to achieve in the two Psychology television groups did do significantly better on the subject matter test than the Control group. This difference did not show up among the Economics groups.

14. There were no differences in gains on self-insight among the three groups on the basis of student scores on the "need to achieve," as measured by a personality test.

A number of significant differences did occur in the data, but they were so distributed, sometimes favoring television and sometimes favoring the Control group, that they gave no clear indication that this variable has any consistent relationship to gains in self-insight.

REFERENCE

1. Birney, Robert and McKeachie, Wilbert. "The teaching of psychology, a survey of research since 1942." *Psych. Bull.*, 1955, **52**, 51-68.

PART TWO

VII. Survey of Non-College Groups

The college courses presented as a part of this project were, with the exception of Economics, courses for college freshmen. Since they were presented by broadcast television, they were open to anyone who had a television set. This made it possible to arrange class groups for other students in addition to the ones participating in the experiment. This led to the inclusion in the original proposal to the Fund for the Advancement of Education of a plan to have additional groups take some of the courses. A thorough evaluation of the outcomes in these other groups would have increased the cost of the study and the amount of time needed far beyond the proposed budget. On the basis of these facts and the further consideration that these additional groups were not really necessary to the central purposes of the project, the Advisory Committee recommended that no attempt be made to evaluate these outcomes beyond the normal course evaluations of the instructors.

The additional groups taking one of the experimental courses were: superior high school seniors, a selected group at San Quentin State Prison, and students from the public at large who signed up for the course through the Extension Division of the College. Each of these groups will be discussed in turn.

These groups could not be incorporated into the basic design for this research study, and no data were available for establishing comparability between these students and the ones taking the regular college courses. The only data obtained on these students were the course examination scores and the final grades assigned to them by the instructor. In some cases the examinations were not the same and, therefore, the scores were not comparable with the college student groups. This was necessary because the students saw only the telecasts and did not meet on campus for discussion sessions. However, comparisons have been made on a basis of final course grades of the various groups. Beyond this, it was felt that no valid comparisons could be made.

High School Seniors

Of the four courses being presented as a part of the Television Project only one seemed appropriate for high school students. The Economics course was at the sophomore level; the Creative Arts course involved participation periods on campus which were impractical to arrange without conflict with the public school schedule; and the course in Basic Communication was deemed not to be feasible by the Language Arts staff for a variety of reasons. The Psychology course was offered to high school students for freshman college credit.

The course was offered to four groups of students through schools in San Francisco, Alameda and Oakland. These schools permitted students who they believed were more able and ready to try college level work to attempt the course. Teachers in these schools served as discussion leaders for the groups, meeting with them during the broadcasts and then leading discussions for about one-half hour after each broadcast.[1] The time of the broadcast was after the normal school hours.

The instructor who taught the television course in Psychology met with the leaders of these groups once near the beginning of the semester to discuss the purposes of the course and to help with any problems they had met. All of the course examinations were prepared by the College, administered by the local course leaders, and then scored and graded by the College. In the case of this course, the same examinations taken by the college classes were used. Precautions were taken by the instructor to code the essay parts of the examinations and mix them in with the products of the college students so that grading would not be influenced by knowledge of the students' high school status. All essay questions were read by three different people and the score given a student represented a composite of their reactions. Points were assigned for the examinations and the final grade was awarded on the basis of these points.

It should be emphasized that the students participating in the course were all volunteers and, counter to normal college regulations, were free to drop the course at any time without penalty. Some of them chose only to audit the course, taking no examinations. However, if they successfully completed the course, upon graduation from high school, they could enter San Francisco State College and receive college credit for the course. For others no permanent record was made of their grades. Fifty-five students started the course and thirty-seven completed it. Various reasons were given by students who did not complete the work. Some were anxious and preferred not to take the examinations, some had other committments on the days the examinations were given, etc. Since the high school students had this option and, in general, only the more confident students completed the work, it is questionable just how comparable these results are with the outcomes for the regular college students. Despite this, an analysis of variance of the scores for the high school students and the three contrast groups of college students was made. The results are presented in Table 50.

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[1] Discussion leaders for the high school groups were: Mr. Bruno Peinado, Encinal High School, Almeda, Calif., Mr. Hal Woods, Alameda High School, Alameda, Calif., Mr. Richard Date, Balboa High School, San Francisco, Calif., and Mr. Andrew Bigge, Abraham Lincoln High School, San Francisco, Calif.

Table 50.

Analysis of variance of cumulative total scores on course examinations for the high school and college groups in the Psychology course.

Group	N	Mean	S.D.	F-ratio
Control	36	113.27	13.23	0.20
On-Campus TV	37	114.54	14.33	
At-Home TV	64	114.04	15.94	
High School TV	37	111.43	21.12	

An examination of this table shows that the F ratio is very low, indicating that the differences among groups are not significant. On the basis of this finding and the discussion above, it seems reasonable to conclude that superior high school seniors who have the confidence to take a college Psychology course by television are capable of doing as well as the college freshmen on the course examinations.

San Quentin Students

Three of the four courses in the experimental project were offered for credit through the Extension Division of the College. These were Psychology, Economics and Basic Communication. Among the extension students in each of these courses was a small group of men who were prisoners at San Quentin State Prison.

The men who participated in these courses were carefully selected by the prison officials. They were all above average intelligence and had at least completed high school. Some of them had had psychotherapy and they were all very interested in taking college courses. The men met together to watch the television broadcast. They had no discussion periods and instructional personnel were not available to answer questions.

The television instructors did go out to the prison on two occasions and met with the groups to discuss the course and answer any questions the men wished to raise. Tests of an objective type for these students were sent to the prison and administered by prison officials. Each of the men also wrote a term paper which was evaluated as a part of the final grade.

Since the actual scores made on the examination or term papers were not comparable to the scores of the college groups, statistical evaluation of the outcomes was not possible. All of the instructors were very favorably impressed with the work done by these students and found the men to be unusually interested and appreciative for the opportunity to participate in the courses. The prison officials stated that they believed the Psychology course was a particularly valuable experience for those participating. The distribution of grades for all of the students in each of the courses is given in percentage form in Table 51. It will be noted that among the San Quentin students who completed the courses, none received a grade below a "C."

Table 51.

Percentage of various grades assigned to students in all of the groups taking Psychology, Economics and Basic Communication.

Course	N	A	B	C	D	F	Incomplete or Withdrew
Psychology							
Control	37	16	32	41	8	0	3
On-Campus TV	38	13	18	58	5	3	3
At-Home TV	70	11	43	34	3	0	9
High School	55	7	31	25	4	0	33
San Quentin	12	8	58	33	0	0	0
Extension	24	4	37	17	0	0	42
Economics							
Control	47	17	23	32	13	11	4
On-Campus TV	33	9	21	33	18	15	4
At-Home TV	51	14	16	43	10	10	7
San Quentin	12	0	92	0	0	0	8
Extension	21	5	24	33	0	0	38
Basic Communication							
Control	29	14	17	45	10	0	14
On-Campus TV	31	10	26	32	3	4	16
At-Home TV	46	9	24	17	11	5	28
San Quentin	15	40	13	13	0	0	34
Extension	10	10	50	0	0	0	40

Other Extension Students

In the Extension Division publicity procedures and on the broadcasts themselves, the public was informed that the Psychology, Economics and Basic Communication courses could be taken by anyone with a high school diploma for college credit. A small number of students from the public at large signed up for each of the courses.

These students saw the two television broadcasts a week and took only a final examination at the end of the course. They did not meet with the instructor for discussion sessions at any time as a part of the course.

Once again, these results were not comparable to any of the college groups involved in the television courses and therefore no direct comparison of the outcomes was possible. The distributions of grades assigned to extension students are given in Table 51 along with grades for all the other groups taking the courses.

With the possible exception of the San Quentin group, the distributions of grades shown in Table 51 are quite typical for college courses. Perhaps the most striking point to note is that the high school students and the extension students in all of the courses showed a very high drop-out rate. In general, the drop-out rate for students in extension courses taught off the campus is lower than for regular classes taught on the campus. However, most extension courses are organized to meet the needs of special interest groups, whose motivation for completing a particular course is generally high. Volunteers from the general public for the television courses may have represented a wider range of motivation.

Summary

Despite the limitations of the data on the non-college groups, it seems reasonable to conclude that students other than regular college students who complete courses offered by broadcast television perform as well as full-time college students.

This conclusion with regard to courses taken by the general public has already been well established by studies of adult education courses. As regards high school students taking college level telecourses, this finding has not been established by other studies. If these same results occur in a study specifically designed to compare the performance of high school students with those of regular college students, it would seem to have important implications. The broadcasting by television of college courses may well be a way to enrich the curriculum and speed up the education of gifted students.

VIII. Professors' Attitudes toward Television Teaching

It will be recalled that the original research proposal set forth a series of questions concerning the major problems a college faces if instruction by television is to be educationally sound. One set of these questions focused upon faculty considerations in presenting college instruction by television. It did not seem feasible to the Evaluation Committee during the planning semester for the project to set up and test research hypotheses based upon these questions. The mere fact that only four instructors were to be scheduled for television teaching during the year obviated a statistical approach to these questions.

However, it was deemed important to gather faculty reactions to the television teaching experience, and to this end each instructor was asked to answer a set of questions (derived from those in the research proposal) after he had completed his semester on television. In addition to responding to the questionnaire, each professor was asked to give a fuller, free response reaction to his TV teaching experience. These statements will be given after the questionnaire results.

The four specific questions concerning "faculty problems" from the original research proposal are repeated here, with questionnaire items and responses appropriate to each summarized below. Since faculty reactions to television teaching varied considerably, each instructor has been assigned an arbitrary code letter below which will enable the reader to follow the responses of any individual instructor as well as to note differences among instructors.

1. **What demands are made on an instructor who televises courses in terms of tension, quality of organization, presentation of materials, etc.?** Two items on the questionnaire pertained to this general area. They are:

1) What did you see as the greatest personal "costs" of presenting a telecourse?
Professor responding:

B—Production problems associated with the telecourse.

CD—Nervous tension of the broadcasts themselves.

AC—General concern about "the next broadcast."

D—Unusual demands upon you to "be at your best" when appearing on a mass medium.

D—Criticism (direct or feared) of professional colleagues.

ACD—Difficulty of gauging how effective the course was—or lack of "feed-back" from students.

Other: Professor D commented: "One of the first things I had to develop was a 'thicker skin' against barbs from members of my own department who obviously didn't understand what this TV business was all about."

2) What sources of satisfaction did you find in teaching by television?
Professor:

ABCD—Experimentation with techniques for presenting course ideas in new ways.

BC—Favorable comments from students.

BC—Favorable comments from colleagues.

BCD—Favorable comments from the general listening public.

ACD—The assistance—production and student help—provided by this experiment.

BD—The feeling that your telecourse was actually a better presentation than your normal or average classroom presentation.

Other: Professor A commented: "The general excitement due to a feeling of trying something really new in teaching." Professor D said: "One of the most satisfactory parts of the entire experience was the way in which the TV staff as a whole worked together. Dave Parker was wonderful—a true artist."

2. **What changes take place in these factors as the instructor gains experience in television?** Instead of devising questionnaire items addressed specifically to this question of "adaptation to the medium" (a phenomenon experienced by the professors in this study and others), the following three items were asked to determine the relation of this experience to future behavior.

3) Will you be teaching your telecourse again next year?
Yes: **B, A** (on part-time basis) No: **C D**

4) Do you think you would be willing to offer a telecourse (and be responsible for four class sections taking it) as a regular teaching assignment?
Yes: **B** No: **A C D**
If "No," major objections to such an assignment.

Professor A: "No. 1) The TV course would always be the major concern of the instructor; I do not want to be limited to a single course. 2) The salary is not high enough. I see no reason why union scale should not apply to TV teaching just as it does to TV acting."

Professor C: "No. 1) Inequitable amount of time and energy. 2) Contact needs with students. 3) Needs to experiment with new methods of interaction."

Professor D: "No. But I would have to know the 'context' in which the course is to be given."

5) How often would you be willing to present the telecourse you have prepared?
B—Each semester
—Once a year
A—Every other year (perhaps)
C—Every third year (perhaps)
D—Never again (under current circumstances)

3. What is a reasonable faculty load for the instructor who televises courses? (The usual teaching load at the college is twelve hours per semester.)

6) Do you feel that one-half release time for preparing your telecourse the semester prior to teaching it was adequate? (If "No," how much **additional** release time would you recommend?)
   A—No, one-fourth additional release time.
   B—No, one-fourth additional release time.
   C—Yes.
   D—No, one-half additional release time.

7) Do you feel that the one-quarter release time from other teaching duties was adequate during the semester you presented your telecourse? (If "No," how much additional release time would you recommend?)
   A—No, one-fourth additional release time.
   B—No, three-fourths additional release time.
   C—No, one-half additional release time.
   D—No, three-fourths additional release time.

4. What assistance, both in the on-campus discussion and in the television studies, needs to be provided to the instructor involved in this program over and above that allocated for regular classroom teaching? (It will be recalled that each professor was given a student assistance fund of $700 to be used at his discretion over both the planning and teaching semesters of his telecourse.)

8) Do you feel that the student assistance fund you were given was a satisfactory and realistic amount? (If "no," how much more do you feel you needed?)
   Yes: **A B C** No: **B**—once again as much.

The final item on the questionnaire was:

9) On a basis of your personal experience with teaching a telecourse, do you feel that broadcast television offers an important solution to the "crisis in higher education?"
   Yes: **B D** No: **C** Undecided: **A**

Summary

1. While it is difficult to generalize about the demands of broadcast television teaching from these limited, individual data, two impressions gathered from the professors while they were presenting their courses seem to be confirmed above. First, for a variety of reasons, skilled and seasoned classroom instructors find the presentation of a course by broadcast television to be a taxing experience, complicated by the uncomfortable feeling of teaching students who are literally not there. Second, on the positive side, all of the professors found their telecourse assignments a challenging experience which provided certain sorts of feedback (from colleagues and the general public) not normally found in classroom teaching. Two professors believed their television presentations to be superior to their normal courses and three expressed their appreciation for the production and student assistance made available for the telecourses.

2. Only one of the four professors in this study expressed a willingness to present his telecourse as a regular teaching assignment each semester, and he is the only one of the original TV Project professors who will be repeating his telecourse on the same basis for a second time.

3. Only one of the four professors felt that one-half release time from other teaching responsibilities during the semester prior to going on television was adequate for the preparation of a course for television presentation. None of the professors felt that one-quarter release time was enough during the semester they were appearing on television, and two expressed the opinion that the professor teaching a telecourse should have no other teaching responsibilities. These results tend to confirm the statements about "felt pressures" of TV teaching in 1, above.

4. All but one of the professors found the student assistance funds provided by the project to be enough. During the teaching semesters, the invaluable help of the production staff was acknowledged by the professors.

5. Finally, the professors were divided in their opinions concerning the importance of broadcast television as an answer to the crisis in higher education.

Professors' Comments About Teaching on Television

Each of the professors who taught a telecourse for this study was asked to submit as complete and detailed a statement about his experience as he wished to make. Those professors who served as discussion leaders for the On-Campus TV sections of the courses were also asked to comment about their assignments in the study. The following paragraphs present these faculty reactions.

Reaction as a TV Lecturer in Psychology 10.1
Dr. Shepard Insel, Psychology

Preparation

Since the particular course taught was still in a flexible and somewhat fluid stage, that is to say, was not completely crystallized as to scope and sequence, it was necessary to develop a broad outline which would be consistent with and acceptable to the department's expectations.

Furthermore, this course had been developed as an exploration experience for the students, in which small groups were maintained to maximize interaction. Emphasis was traditionally placed upon student investigation and assumption of student responsibility in taking part in the course development. Thus, the design of the course had to be shifted in order to accommodate the TV medium. This meant that the teaching-learning experience via the TV screen had to de-emphasize the student's responsibility in the course development, not only in the planning sense, but also in the guiding sense, since many of the spontaneous cues and side questions upon which the creative teacher comes to depend, would be lacking.

As a consequence of the anticipated lack of student-teacher interaction, the course design was structured to include two student proxies to the unseen student audience. A young man and woman were selected for their ability to be comfortable in a public situation and who had taken the course earlier. It was assumed that the proxies would be able to ask questions ordinarily raised by the larger student body and act as representing both sexes in the specific questioning. Furthermore, their presence would also function to keep the instructor aware of his clarity of language and thought and his pacing or timing.

A great amount of preparation time was utilized in planning and investigating visual and graphic aids to the ideas under consideration. Over 150 films were reviewed and permission requested to use them on a telecast. In a number of instances, as many as eight film portions were spliced together to afford the kind of sequence of ideas developed for a particular session. In those instances, consultations had to be made with audio-visual specialists, and their help enlisted. The artist employed for the project required ample advance warning to develop the charts and pictures necessary to portray the ideas desired. The same applied to the photographer who developed stills which were felt to be the best means of visualizing a particular idea. In each instance, an attempt was made to concretize any communication of verbal ideas with visual examples.

The major preparation in terms of concentrated time and effort had to do with the utilization of dramatic vignettes, short skits put on by drama students to portray complex human interaction so that the learners would share in a common experience upon which the instructor could focus theoretical concepts. Most of these scenes lasted no more than two minutes, and in many instances only a very small script was developed. However, in 28 sessions there were some 50 of these, and dialogue, casting, setting, and short rehearsals involved a large portion of the allotted time.

The total preparation period evolved into three broad phases. Phase one had to do with the broad outline of the course, its scope and sequence. Phase two involved the attention to some of the details for each session—films, graphic aids, skits, casts, dialogues, etc. However, it was found that when the first ten sessions had been fairly well identified, then the remaining 18 sessions were left quite flexible so that changes and reorganization could be more feasible.

Phase three had to do with the ongoing day to day changes which included unforeseen problems such as mechanical failure, incomplete coverage of the previous session's sequence, casting difficulty, and so forth. In addition, it was found that as greater experience accrued and new insights occurred, sessions were rewritten, new skits added, and sequences were shifted about. Considering the fact that there were two 45-minute sessions weekly, this meant that no sooner did one session end when plans and preparations for the next session were begun. In each instance there were at the very minimum three people to be involved in the development of each session. These included 1) the instructor 2) the director 3) the producer.

One other preparation task included that of developing a syllabus which would be in the hands of the student before the course began. Because of the nature of the course, and its "open-ended" approach, the syllabus was designed to guide the student by raising broad questions for each session and to broadly categorize the developmental sequence. A list of appropriate readings for each session was developed also.

Reflections on the Teaching Experience

On reviewing the total experience of teaching a full course for credit as part of this study, I have become aware that teaching by open circuit TV at this time of its development is very much affected by the total social context in comparison with standard classroom activity.

For one thing, the idea of TV teaching elicits strong feelings both pro and con from one's colleagues. Despite the experimental character of this study, the impact of feelings was something with which to contend. It seems that the entertainment status of television tends to lend some negative value to the idea that appropriate and planned education can occur by TV.

Secondly, opening up the classroom, as it were, to public view which includes all of one's colleagues changes one's perception of the teaching-learning scene and heightens one's awareness of the real complexity of the task. In short, a person is put on the spot to produce, and the demands made are quite varied. However, it is interesting to note the amount of identification and sympathetic support by all of the segments of the interested population, i.e., students, teachers, administrators, parents and other viewers. Nevertheless, the specter of the unseen critic gives one pause and to some extent is a deterrent to free and open and purposive communication.

The two major problems which I found to be most contentious regarding teaching via TV may be found in the general area of the teaching-learning process. The TV medium only brought them into sharper focus. The primary problem concerns itself with the conflicting conceptions of how people best learn. The TV medium can be admirably fitted to any presentation approach to learning as far as I am concerned. However, I feel that the loss occurs when active-participating-learning becomes the issue. The teacher who considers his best skill as that of facilitating the learning process of the learner, and derives his professional satisfaction thereby, can at best second-guess the needs and motivations of the learner. One alternative is to have the learners participate in the presentation.

The second major problem has to do with the fundamental need for the process of immediate feedback to occur when purposive communication takes place in the teaching-learning process. The most intense adjustment I was forced to make in this experience was that of developing a mental image of the learners to whom I was talking and responding to that generalized image as the stimulus, second guessing their questions, rephrasing when I felt a point was communicated fuzzily, emphasizing certain key words, pausing long enough for some particular idea to soak in, and so forth. These, of course, are required for every presentation approach. However, lecturers are able to assess audience reaction when they are in face-to-face contact, and their skill derives in accurate assessment. The proxies reduced this problem for me to a great extent. Another commonly used device is to have a group of learners participate as an audience in the studio.

Because of the lack of immediate feedback from the learners themselves, a lesser problem developed, though it may be useful to describe. In the teaching- learning process the instructor evaluates his particular efforts in terms of certain criteria upon which he comes to depend. The number and kind of questions raised by the students, after-class discussions, the general tone of the students as they leave the classroom, the amount and kinds of interference or the quality of attention given, are some of these criteria. With the above cues lacking, I found myself becoming dependent upon those colleagues or interested persons with whom I had more immediate contact and who viewed the session, for their impressions. While these were helpful, they nevertheless did not represent the group of learners, and all too frequently, these critics were more attuned to the production aspect of the session, and less aware of the learning value of that session. This implies a schism in the overall experience, a lack of integration, which cannot help but be frustrating to the instructor. Thus, it can be seen that the sustaining satisfactions in this experience were, for me, related to its experimental nature, and to the fact, perhaps, that I, as the instructor, learned as much if not more than any of my students.

Reaction as a Discussion Leader in the On-Campus TV Psychology 10.1 Section

Dr. Morton Keston, Psychology

Positive factors which come to mind in reviewing the participation as discussion leader for the On-Campus TV group include the following:

1. The telecasts provided a basis for developing a point of view toward the new medium.
2. The experience provided first hand observation of the reactions of students during their initial exposures to educational television. This particular group reacted unfavorably early in the experiment, and then seemed gradually to come to an acceptance of the medium.

Negative factors which come to mind include:

1. Bi-weekly scheduled meetings provided serious drawbacks:
    - (a) Telecasts so long past, they were difficult to recall.
    - (b) It was difficult to develop rapport with the class because of the length of time between meetings.
    - (c) Time is apt to be poorly or ineffectively used when two hour meetings are scheduled for college freshmen.
2. In such a set-up, the discussion leader is participating in the teaching of material which is not his own and which may be foreign to his point of view.

Recommendations for the future would include:

1. It would be better for the discussion leader to view the broadcasts in the same room with the students. This would tend to increase the rapport between discussion leader and students.
2. In order to participate effectively, the discussion leader should see all telecasts, as was done in this case.

Reaction as a Discussion Leader in the On-Campus TV Social Science 30 Section

Dr. A. Walter Olson, Social Science

My comments and reflections on the S.S. 30 Television Project are based on the following experience: acting as a discussion leader of the On-Campus TV group, which met for a two-hour period every other week.

Student Reaction From My Point of View

1. There was not enough continuity between lectures on TV and class discussion. There was a considerable time lag between our discussion and the lectures. Points that the students might have made or asked about at the time were forgotten by the time they reached the discussion class.
2. The students did not take the discussion class seriously as they felt the main emphasis was on the lectures.
3. The discussion should have been one hour once or twice a week. Both possibilities were mentioned by the students at various times.
4. The students did not get to know me and, therefore, did not identify themselves as my students.
5. This part of the course was a real chore.

My Own Reaction to the Class

1. I had little if any real identification with the class. They were just not my students.
2. My own attitude, based on point one, was something less than enthusiastic.
3. In teaching the class, it was necessary to reconstruct the general theme of the previous two weeks and encourage them to look at their notes and text for possible questions. It usually turned out that I lectured most of the time. This is not my idea of a discussion class.
4. Though the TV lecturer and I did cooperate in making up the second test and the final, "sharing" a class with another professor presented difficulties that were not altogether overcome.
5. This experience was without question the most unrewarding teaching that I have ever done.

Reaction as a TV Lecturer in English 6.1, Spring, 1957

Dr. John Clark, Language Arts

A. Special considerations which apply to this particular course as presented Spring Semester, 1957.

    1. The course is not a lecture course — at least as it has been conceived for the classroom. An important part of the course as it is usually taught is the interchange not only between instructor and student, but between student and student. Thus "feedback" is not only important to tell the instructor how the course is proceeding, but as a skill for students to practise and learn. Obviously, this is difficult, if not impossible, in the TV situation. Two remedies were attempted to meet this deficiency.
        - a. The students were asked to write reaction papers to the TV presentations as well as to the readings from the textbook. This helped, but it did not replace the face-to-face contact among the students.
        - b. Occasional student-faculty panels were used, and sometimes all-student panels were presented. These did not, as it turned out, serve as substitutes for actual participation. There appeared to be almost no identification by the students watching the sets with the students participating

in the TV presentation. Students complained that they had to watch other students who knew no more than they did about the matters under consideration. This is not a complaint when student panels are used in the classroom, where the audience can ask questions or make statements of their own.

   c. I found no satisfactory substitute for the classroom experience in English 6.1. This was a very important deficiency in this course as taught on television. It might or might not prove as important in a lecture course, or in a straight freshman English course of the "1A" type.

2. I used many other faculty members during the semester to assist in presenting the course. This offered two advantages:
   a. It gave a chance for the TV students to see and hear instructors who were specialists in particular subject matter areas. For example, the novel *The Oxbow Incident* was part of the assigned reading. Since Walter van Tilburg Clark, the author of *The Oxbow Incident*, teaches on our staff, I was able to persuade him to appear with me to discuss the novel. I used some twenty or twenty-five instructors in this manner during the semester.
   b. This procedure involved most of the department members, and as a result they were able to get first-hand experience in TV teaching. The department is now in a good position to make an intelligent decision as to whether we should go ahead with this project or not.

   There were also some disadvantages:
   a. The appearance of so many different instuctors may have made it difficult for students to adjust to the class.
   b. Because each instructor had a specific assignment, the course tended to become a series of "programs," and it became difficult to maintain continuity in the students' view of the class.

B. In the course of teaching Basic Communication on TV, I arrived at a kind of attitude toward teaching on television which was helpful to me in carrying out the assignment. It involved a definition of the role of the TV teacher.

   1. Although I had had some experience on both commercial and educational television prior to this assignment, I found that this was not particularly helpful; both the circumstances of production and the purpose of the presentations were entirely different. A beginner might experience some anxieties, but I believe these would soon wear off.

      As I indicated above, I used many different faculty members at various times. In no case did any instructor report excessive apprehension. One was more nervous than the others, but he was much freer after the first appearance and actually looked forward to the second. It seems to be rather pleasurable to appear on television, whether it is pleasant to take a course on it or not.

   2. One very important approach to television teaching seems to me to be that the teacher avoid any attempt at "slickness." The teacher should insist that he be in control of the planning stage, and he should avoid the use of techniques which require skill in timing, in performing, in "acting." He should never permit himself to appear to be attempting something which professionals do better, or in which he might be compared to a professional TV performer.

   3. I tried to develop a "mental health" approach to TV teaching, and I succeeded to some extent, at least. My contention was that the teacher should never feel more tension in front of the TV cameras than he does in his own classroom. Once his lesson is prepared (with charts, graphs, skits, or whatever other "visuals" he plans), the unexpected should not bother him. In looking for a recipe for calm, I would make the following suggestions:

      Maintain some control of production elements, even during the actual broadcast. If an example calls for close camera work (as on a student paper or blackboard writing), the teacher should feel quite free to look at the monitor to check picture clarity without concealing the fact that he is looking at the monitor. If the picture is unclear, the teacher should feel free to try another camera angle—or to abandon the attempt altogether and try something else. The "show," for the good mental health of the instructor, should be secondary. (The example used above assumes that camera rehearsal time was not available to check all such shots; I found that this sometimes happened.)

      Maintain flexibility of programming, especially the time elements. The teacher should not permit himself to be caught in the commercial pattern of 28½ minutes to the half-hour, nor should he hold himself to the necessity of providing a good "wind-up" at the expense of content. (Normally careful planning should be done, of course, but there is a tendency to sacrifice all else to the clock in TV.) If a lecture, or more likely perhaps a panel discussion, should give evidence of running over-time, the instructor should feel free to suspend it at the conclusion of one hour and let it begin where it stopped at the beginning of the second hour—just as one might in the classroom. This prevents a kind of desperate "We must come out on time" feeling that causes the teacher to forget the end for which TV is, after all, only the means.

      Solicit criticism instead of fearing or resenting it. I found that all shades of opinion were available about any single telecast: that some students would resent or object bitterly to certain presentations that other students would feel were the "best things yet done." This polarity of opinion seemed to be much more marked than in the classroom; perhaps because the students did not share a common viewing situation. Faculty criticism, on the other hand, usually comes from people who have seen an isolated telecast, and is surprisingly often based on the same standards which they would use for a commercial "program," ignoring the necessity to view any given presentation in the perspective of the whole series.

I found it possible to avoid "defensiveness" about the course and about criticism from colleagues by assuming that it was not my course, but the department's. If there were specific criticisms I was able to accept them and make use of them by treating them as criticisms of a specific attempt to solve a particular teaching problem. One must avoid as much as possible the quite natural ego-involvement one has in a "performance" and avoid also viewing criticism as if it were attacks on personal effectiveness as a teacher or as a human being.

Reaction as a Discussion Leader in the On-Campus TV English 6.1 Section

Dr. A. T. Anderson, Language Arts

The responsibilities of a discussion leader in an English 6.1 television class may differ from those faced by teachers of other televised subject matter. English 6.1 is essentially a skills, not a content, course, and students in it are graded almost entirely on the quality of their written work. The discussion leader in the English 6.1 television group, therefore, is responsible for more than discussing televised matter and course readings and administering group examinations He must read and evaluate student themes, discuss them in class, clarify matters of rhetoric and acceptable usage, and hold conferences with students who need individual help. In short, he must create an English skills course within the brief time allotted him "to discuss and clarify" material presented via the picture tube.

Students in my English 6.1 television group felt the very real "divorce" between the materials and personalities they were exposed to on TV and what happened in the all-too-brief discussion meetings. They discussed their frustrations and anxieties at length. Such discussion was not entirely a waste of time, since students' attitudes toward the course improved after an initial six-week shock.

My frustration rising from the experiment, beyond the difficulties outlined above, is of a different nature. The heart of a skills course lies in the written work produced by students, by their improved ability to read adult material critically, and by their growing confidence and competence in speech. These matters were not central to the experiment's testing program. I am disturbed because, although I recognized the difficulties and limitations involved in measurement, I do not feel that we will know from the experiment what effect resulted from either students' exposure to TV or to the discussion meetings.

Reaction as a TV Lecturer in Creative Arts Exploration

Dr. Mayo Bryce, Creative Arts

These are random comments and suggestions which I make at the conclusion of the television experiment.

For one thing, much more time is needed by the entire Creative Arts 10 staff in order to plan together—philosophy and the multitudinous administrative details which must be talked over jointly. Some actual teaching units should be built into the programs of each of the teaching staff. It is my strong suggestion that the coordinator be given no other duties than to "coordinate," and that the laboratory sections of whatever part of the course would involve the coordinator—be placed under the direction of an entirely separate individual. In other words, there would be five individuals involved in Creative Arts 10. I find it almost impossible to plan, coordinate, and at the same time, teach. It's too much for any one person.

Another comment about planning — whoever coordinates the TV course should have each of the individuals concerned with the course presentation available to him for consultation during the semester preceding the time the course goes on the air.

Consideration should be given to scheduling only one television broadcast per week, followed immediately by an on-campus workshop. This semester, "the tail wagged the dog." The staff as a whole felt that they did not see the students often enough; conversely, the students felt neglected by the staff.

A general suggestion—It is my considered opinion that the experiment be tried some time with upperclassmen. The freshmen and sophomores appeared to be too immature to respond as they should to an experiment of this kind.

Another suggestion—this semester it seemed unadvisable to project this experiment into the area of off-campus Extension with the many involvements of a course such as this, which included the complexities of dance, for instance. If the course were entirely an appreciation course, perhaps it would be logical to operate for extension.

Lastly, I feel that the staff feels strongly that the departments of the division be sufficiently informed of this experiment so that they understand it and can offer a sympathetic and helping hand. However, the division chairman has expressed a most gracious attitude which the staff appreciates.

Summary of Instructors' Comments

A number of the comments made by the television instructors in this study seem to be typical of those made by the college professor teaching his first television course for college credit—whether by closed-circuit or broadcast television. These are concerned with:

1. The isolation of the professor from the students he is teaching.
2. The slow or inadequate feedback from students about problems they encounter in the course.
3. The reduction not only of student-professor interactions, but also student-student interactions imposed by the TV medium.
4. Problems of integrating materials presented by television with campus discussions.

Reactions more specific to teaching via broadcast television in the present study are:

1. The timing and pacing pressures of a 45-minute television broadcast.
2. The problems of adjusting to the complexities of television production.
3. The psychological pressures of "being on public view."
4. The handling of comments and criticisms from professional colleagues. The varied experiences of the pro-

fessors in this study suggest strongly that the extent to which one's departmental and divisional colleagues are *involved* in both the planning and execution of a course, the more positive or acceptable faculty comments become. It must be emphasized, however, that this does not *simplify* the problems either in the planning stage of the course or in the integration of many guest appearances into the course structure.

5. The selection of bi-weekly, two-hour discussion periods for the TV groups during the first semester of this study was apparently an unfortunate choice. Weekly discussion periods of one hour were considered much more satisfactory during the second semester.

6. Despite the problems associated with teaching a course by broadcast television, all of the professors responsible for presenting telecourses in this study found the experience to be an interesting and challenging one. They did, however, vary markedly in their willingness to repeat the assignment.

The comments of the professors who served as discussion leaders for the On-Campus TV groups—both during the teaching semesters and in their statements above—suggest a rather low level of job satisfaction with their teaching assignments in the study. Although the writing assignments in the English course (and perhaps the weekly rather than bi-weekly discussion periods) seem to have enabled the discussion leader for this course to identify more closely with his students, the comments of the three On-Campus TV discussion leaders point up:

1. The rather ambiguous assignment of the On-Campus discussion leader because he was not "teaching his own course."

2. The special problems of integrating the TV material with discussion sessions since the two parts of the course were handled by different professors.

3. The tendency on the part of the students to devaluate the discussion periods and to consider the TV broadcasts to *be* the course.

4. Individual reactions to the experience ranging from "a basis for developing a point of view toward the new medium" (Psychology) to "the most unrewarding teaching I have ever done" (Economics) and primary concern over the experimental evaluation (Communication).

IX. Production of the Four Telecourses

The task of translating the General Education courses used in this study into telecourses for broadcast presentation was both extremely complex and challenging. As mentioned earlier, the process involved three distinct, though mutually interrelated, lines of responsibility in the development, execution, and evaluation of the four telecourses experimentally. The preceding chapters, devoted to the experimental evaluation of course outcomes, have not done justice to the efforts of many people in the planning and execution of the telecourses. The purpose of this chapter, then, is to attempt to describe some of the very real complexities a college faces when it initiates a program of systematic instruction by broadcast television.

In April, 1956, during the planning semester for the project, Dr. David Parker, who was in charge of producing the courses on television, set down a series of television production objectives. Since they reflected not only the general production approach to the courses but also spelled out numerous details for the planning and teaching semesters, they are given below.

Television Production Objectives

Dr. David Parker, Producer

Since the end product of the present planning sessions will be shaped in large part by the nature of the television production approach, it is important for the planning committee to have a statement of that approach and the basic thinking which is behind it.

At the outset it must be emphasized that courses-for-credit on television are profoundly different in their concept, method, and objectives from the bulk of "industry" program offerings. Telecourses are not designed with an emphasis on entertainment, diversion, or spectacle. Instead, they are designed to achieve an active, participative response from the viewer which should produce desirable changes, whether in knowledge, attitude, understanding, skill, interest, values, or a combination of these. While to achieve their separate objectives, both "educational" and "industry" television programs must first create audience interest, the techniques used in **creating** it are likely to be different.

Obviously we plan to interest television viewers in our series. But the main interest values, as well as the educational values of the series, must come from the skillful communication of the subject matter rather than from production devices or gimmicks which dominate the performer or which exist to evoke sensation. In productions of this kind, personalities are always more important than the technical paraphernalia which may accompany the presentation. All of our production values must be predicated upon a respect for the performer as an educator, and every effort must be made to convey the performer's teaching personality intact.

This is not to minimize the importance of visual aids and other production devices. Wherever they are appropriate to the content, and whenever they complement the objectives of the programs, production aids must be used fully. It is our hope that this series will never become a stereotyped, imitative, or unimaginative presentation. One of our chief objectives is to experiment with the possibilities of the television medium in the teaching situation. This means that we will be constantly seeking out untried methods of presentation, and new combinations of sight and sound which promise to be exciting and effective. Freedom to experiment is the special privilege and the great advantage of educational television—it would be a mistake to minimize experimentation in our planning.

Our program content has dignity and academic respectability. It should be the purpose of the total production to reveal this content in the most interesting and compelling way consistent with the serious objectives we have set for the series.

It would be difficult to overestimate the importance of the TV teacher in the present undertaking. Virtually the entire burden of making the courses interesting and effective falls directly upon him, and no combination of production devices, however imaginative, will substitute for excellent instruction. For this reason, it has been urged that one of the criteria used in selecting the teachers for the telecourses involve a demonstration of skill in a "studio" situation. Accordingly we have made arrangements with KQED to conduct a series of "camera tests." Although we have not yet completed these "tests" for all of our instructors, we are satisfied that they are necessary, and we are encouraged by the results.

Our television instructors have already begun to organize their course material into 45 minute segments. They are now outlining this material and are meeting with the visual director and the television producer for the purpose of establishing the various visual requirements of the individual programs. It is anticipated that by the end of the present semester the bulk of the visual aids (charts, film clips, slides, etc.) will have been determined and listed for manufacture, purchase, or accumulation. This semester, (Spring, 1956) is being used to plan the two courses to be telecast next fall. The fall semester will be used to plan the two courses to be telecast in the spring of 1957.

Beginning at least two weeks before the date of the first telecast in the fall, the total production organization will be fully activated. This organization has already been selected, its responsibilities fixed and its counsel sought. Aside from the producer, the production organization includes the following jobs and requires the following responsibilities:

1. Program director: The director's main responsibility is to organize the individual programs for their optimum camera presentation. He calls all camera shots, determines set and prop location, establishes lighting requirements, blocks all physical action, and arranges for the treatment and sequence of all audio and visual elements.
2. Visual director: The visual director's main responsibility is to conceive and supervise the execution of the various visual and audio devices used in the programs. These include charts and graphs, title cards, drawings, film clips, slides, photographic enlargements, etc. The visual director is responsible for the purchase of his supplies. Working under his supervision is a graphic art specialist.
3. Production coordinator: The production coordinator is directly responsible to the producer whom he assists in the many peripheral matters which pertain to the organization and presentation of a television series. He will be in charge of accumulating the various audio and visual devices which are required for the programs and will be responsible for seeing that they are in the studio at the time for the broadcast. He will also supervise the assistant directors.
4. Assistant directors: Four assistant directors are assigned to the series—one for each of the four courses to be telecast. They will work closely with the particular TV instructor to whom they have been assigned, and will work as floor managers during the times their programs are on the air.

One week before the scheduled start of the series, a closed-circuit audition of the first four programs will be held in the KQED studios. The purpose of this audition will be to familiarize the instructors with the studios and the set and to permit them some

> "on camera" experience before the series actually begins. It is intended to schedule a regular rehearsal session for all of the programs once the programs are being broadcast. These sessions will provide for the specific camera blocking of the shows and will provide an opportunity for the confirmation of audio and video requirements. While it is believed that excessive rehearsal destroys spontaneity, it is felt that a certain amount of practice is necessary until the instructors begin to feel "at home" in their television environment. When that time arrives (probably in the second or third week of the series) the above rehearsals can be shortened until they become little more than a simple "talk through."
>
> It is recommended that both a "dry" rehearsal and a camera rehearsal be held on the day of the air show. These sessions, held in the KQED studios, will accomplish two objectives. First, they will provide the instructors with a final chance to work in the set with all of their production aids. Second, they will alert the camera, audio, and lighting crews to the nature of the program. This is essential if a smooth production is to result.
>
> It must be emphasized that the quality of the technical crews is of vital importance to the success of this undertaking. No matter how much planning goes into a show and no matter how adequate the production budget, the final result—the result seen by the public—is determined in large part by the men who operate the television equipment. Bad camera work can vitiate the effects of the most careful planning and the most excellent performance by the instructors. The same thing holds true of the audio, video and lighting work.
>
> As a final note to this statement, I would like to make the following observation. We are about to organize and produce a series of programs which will be seen and evaluated by many people in the community. While there may be a natural tendency for many to interpret our programs as "classes," they will probably be described by most as "television shows." Described as such, our programs will be expected to compare with the technical standards set by existing high-budget "industry" shows. Whether or not this is entirely "fair," it is a challenge which we must recognize and be prepared to meet. We must never allow ourselves the luxury of excusing second-rate presentations on the grounds that they are, after all, only "college" productions. At the present time, one of the great shortcomings of "educational" television is that it often relies for its effectiveness upon the assumed principle that dignified objectives and traditional content make good programs. Unfortunately this is not true. It is only when **all** aspects of the total production are meshed toward the accomplishment of the specific end in view that effective television programs result.

As indicated earlier, the statement above was written before any of the broadcasts in this series was produced, but in broad outline it holds up well as a description of what actually took place in the production of the series. It had been our hope to have the producer give his candid reactions to his experiences in producing the telecourses, as the other professors had to their television teaching in the study. Unfortunately, the producer left the College to accept a commercial television assignment before writing such a statement. Although the writers saw all of the broadcasts on a television set in the project office and shared this office with the production staff during the first semester of the study, their knowledge and appreciation of the behind-the-scenes production problems entailed in the four telecourses are limited to impressions gleaned from those more directly involved. Despite these limitations, several comments seem appropriate here.

1. "Course" or "Show?" Despite Dr. Parker's careful production statement and the understandable concern of the television professors about presenting academically sound college courses via television, the very nature of this project produced conflicting feelings about "effective teaching" vs. "effective television." This stemmed from the fact that from the inception of the project the adaptation of the four courses for presentation by television was viewed as "frankly experimental" in the sense that they were "to take maximum advantage of the medium."

A number of the professors' comments about their TV teaching experiences have been addressed to this general problem, which will not be belabored here. It does seem important, however, to emphasize the tremendous amount of work both the planning and execution of these courses entailed because of the ambiguities inherent in the exploration of new teaching techniques appropriate to television. Each course presented problems of its own in this regard, but the telecourse which emerged in each case represented the combined best efforts and imagination of the professor for the course and the production staff. There were, of course, areas of disagreement about methods of presenting material and production techniques to use, but these tended to be resolved on a basis of mutual respect for professional colleagues and the best judgment and/or compromise among the participants. Specific experimental techniques used in each course will be described more fully in the next section.

2. Related to the first point, we cannot refrain from commenting upon the relative demands of broadcast television vs. closed-circuit television. With the possible exception of closed-circuit courses which are being kinescoped for subsequent broadcast, the demands upon the professor and the production staff using a closed-circuit system appear to be considerably less taxing than those of broadcast television. In the first place, the professor lecturing into a closed-circuit system characteristically operates in a classroom setting with whatever usual classroom equipment he finds comfortable and usable. Even when the lecture originates from an on-campus studio, the studio set usually consists of typical classroom furnishings appropriate to the course. Furthermore, it has been our observation that the general activity level around campus studios is considerably lower than at educational television stations producing a good proportion of "live" broadcasts in their schedule.

Perhaps the most striking contrast between the two types of telecourses lies in the "psychological barrier," namely, who is at the receiving end of the broadcast. In closed-circuit telecourses, the professor is talking to enrolled college students who are likely to represent a reasonably homogeneous group with respect to background and maturity for the course. The professor teaching by broadcast television faces the fact that his enrolled students constitute only a segment of his audience, which may also include friends, professional colleagues, television critics and a host of others. There is little question, we believe, that this fact also acts as a challenge to a production staff and is reflected in the quality of the broadcasts.

3. A third and very significant aspect of the production of the four experimental telecourses was the direct "laboratory" or "field" experience it provided for students majoring in the College's radio-television curriculum. In addition to their course work on campus, radio-TV majors had the opportunity to carry a variety of assignments on production crews for the telecourses.[1] These involved carrying the responsibility for securing all "props" for

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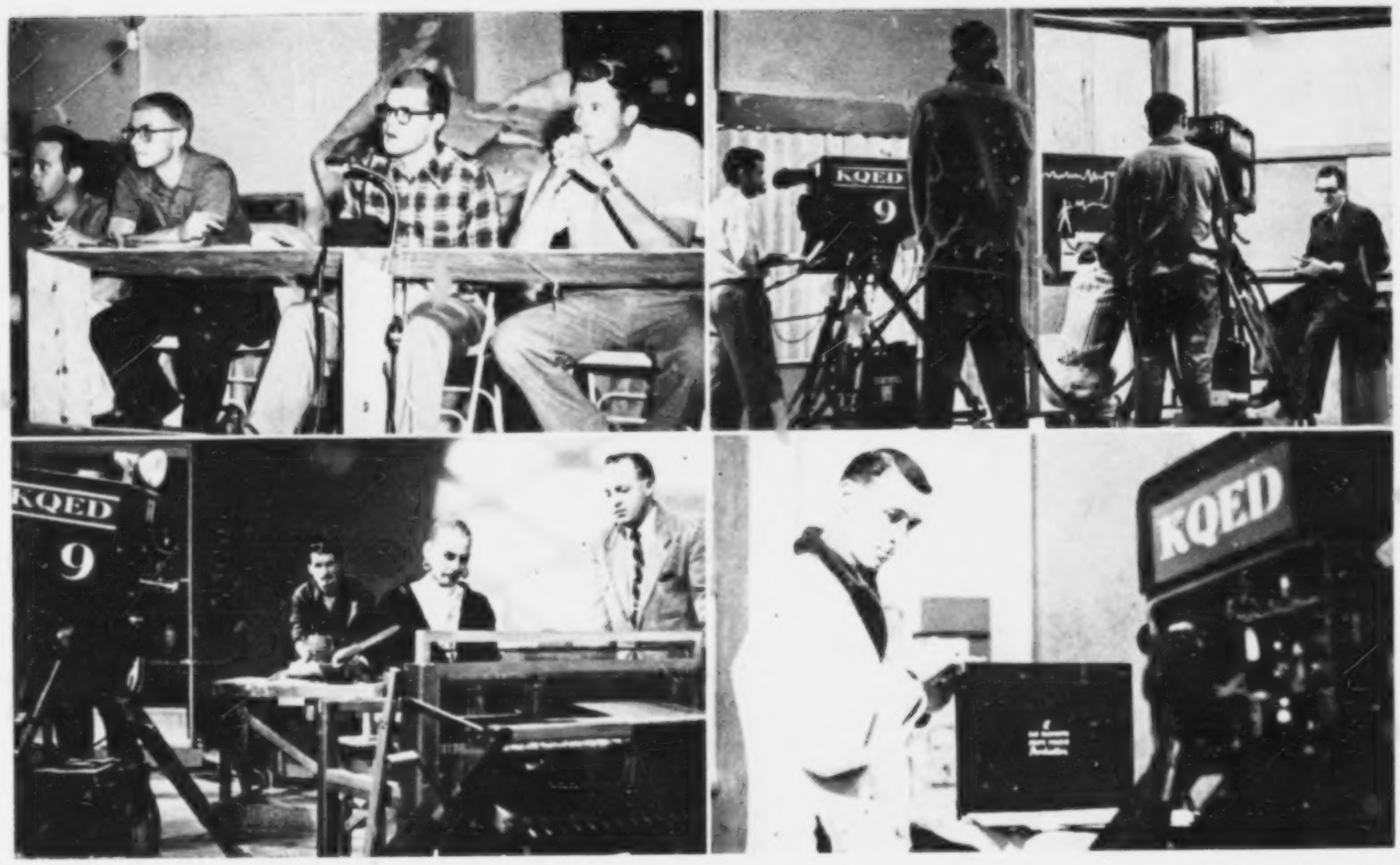
[1] The writers wish to acknowledge the contribution to the success of the telecourses of the following student crew members: Phebe Brown, Dick Christian, Don Dulmage, Wendell Ford, Norm Harloff, Len Hansen, Mark Jorgensen, Jerry Motta, Bob Mulroy, Harry Ratner, Chuck Schultz, Bob Sommer, Charles Walker.



—Photo by Phebe Brown

Figure 1. Production crews in action.

broadcasts, serving as cameramen and floormen during broadcasts, and acting as director or assistant director on specific broadcasts. (Figure 1). In addition, drama majors appeared as actors in a number of skits used on the broadcasts.[2] The opportunity for advanced students to participate in a series of "live" broadcasts was viewed an invaluable experience for them by the faculty in these departments.

Production Techniques Used in the Four Courses

In the professors' statements about their telecourses, a number of comments were devoted to the production aspects of the courses. Our purpose here, therefore, is to summarize briefly the unique production "styles" which characterized each course.

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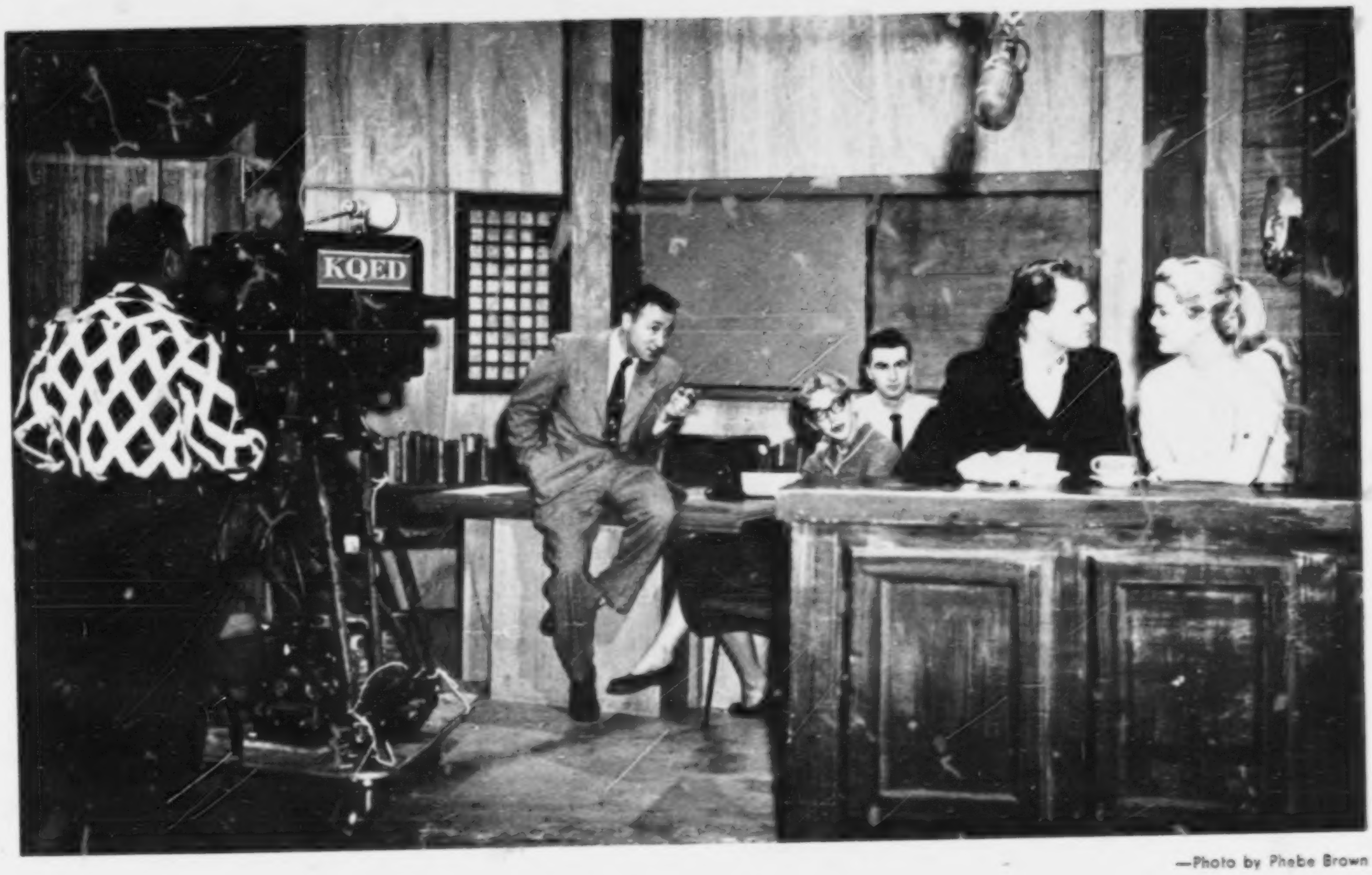
[2] Students who volunteered for assignments as student actors on the telecourses were: Robert Ackerman, Jack Angel, Sandra Archer, Lorraine Bergstrom, Dolores Bernhard, Frances Brown, Benita Camicia, Richard Cherney, Callie Christensen, Ronald Christensen, Richard Christian, Ronald Collier, Vincent Cortese, Fred Davis, Van Dietz, Sheldon Feldner, Wendell Ford, Peter Forette, Peter Garrett, William Grant, Patricia Harden, Becky Haver, June Herrup, David Horwitz, Mark Jorgensen, James Lantry, Dona Larroche, Richard Lee, Merrill Malkerson, Mary Mills, Jerome Motta, Robert Mulroy, John O'Connor, Penny Pritchard, Richard Ponts, Harry Ratner, Neil Remnant, Clifford Rivers, Joyce Rogers, Pamela Sanders, Ronald Schell, Charles Schultz, Nancy Sessions, Nancy Silverman, Robert Sommer, Robert Stephens, Mary Sue Tatum, Madaleyn Terstege, Barbara Toffelmier, Morgan Upton, Charles Walker, Charles Ware, Sandra Young.

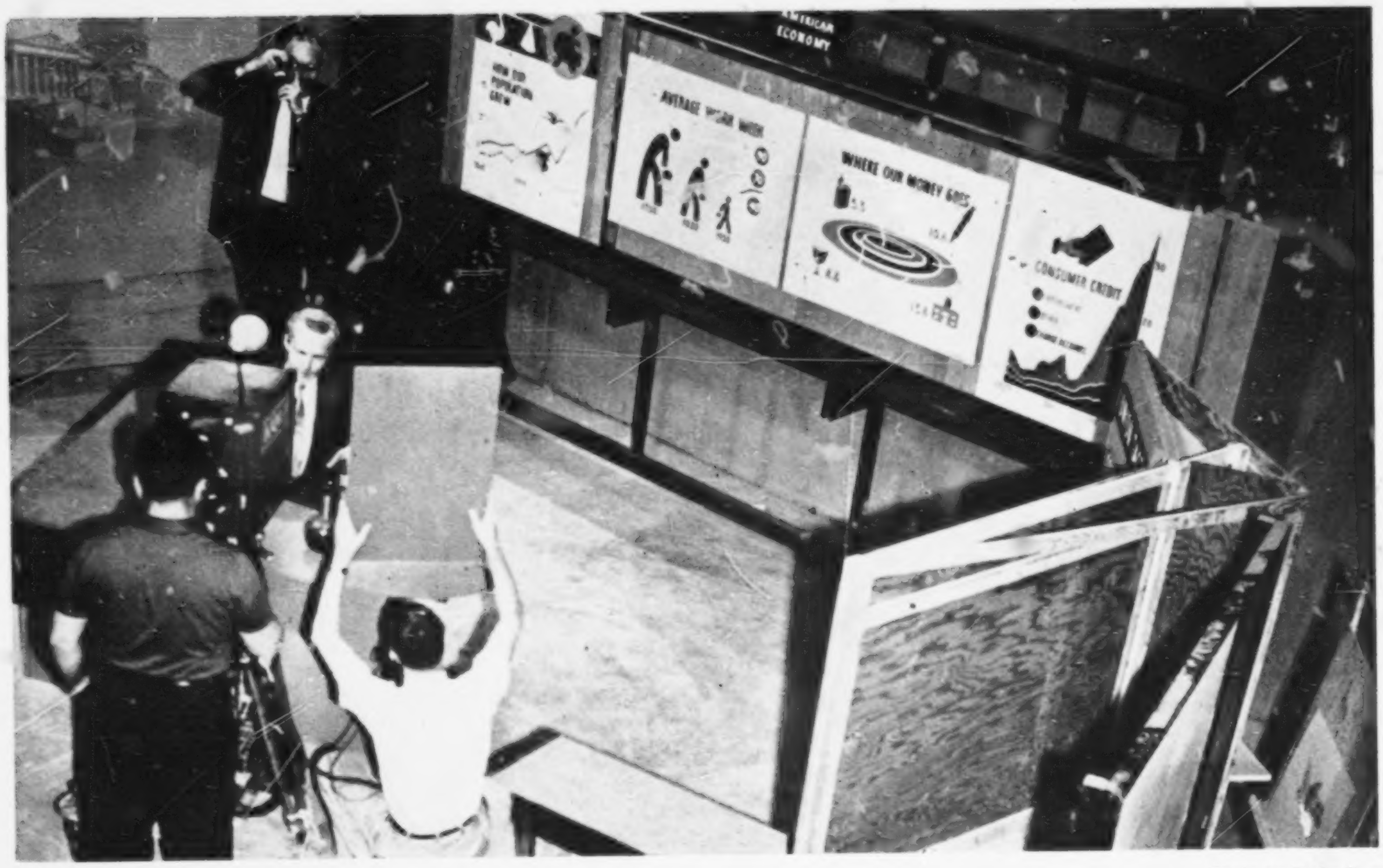


—Photo by Phebe Brown

Figure 2. Student actors (right foreground) rehearsing a short dramatic skit for Psychology 10.1, as the professor and student proxies look on.

Psychology 10.1

The overall "atmosphere" of the broadcasts for this course was a friendly, informal consideration of the personal and social adjustment problems of college freshmen. In addition to the professor's general, "unbookish" approach toward his material, two specific production techniques enhanced this atmosphere. The first of these was the presence of two students who acted as proxies for the students taking the course. They were free to interrupt the professor with spontaneous questions and were brought into discussions of the material by the professor. Secondly, this course made rather extensive use of short dramatic vignettes to portray situational conflicts and adjustment problems appropriate to the material under discussion. (See Figure 2). In addition, several broadcasts were built around consideration of a particular topic by a panel of experts (e.g., a doctor, a psychiatrist, a minister, and a psychologist). Some use was also made of adjustment and mental hygiene films, which are commonly used in the classroom presentation of this course.



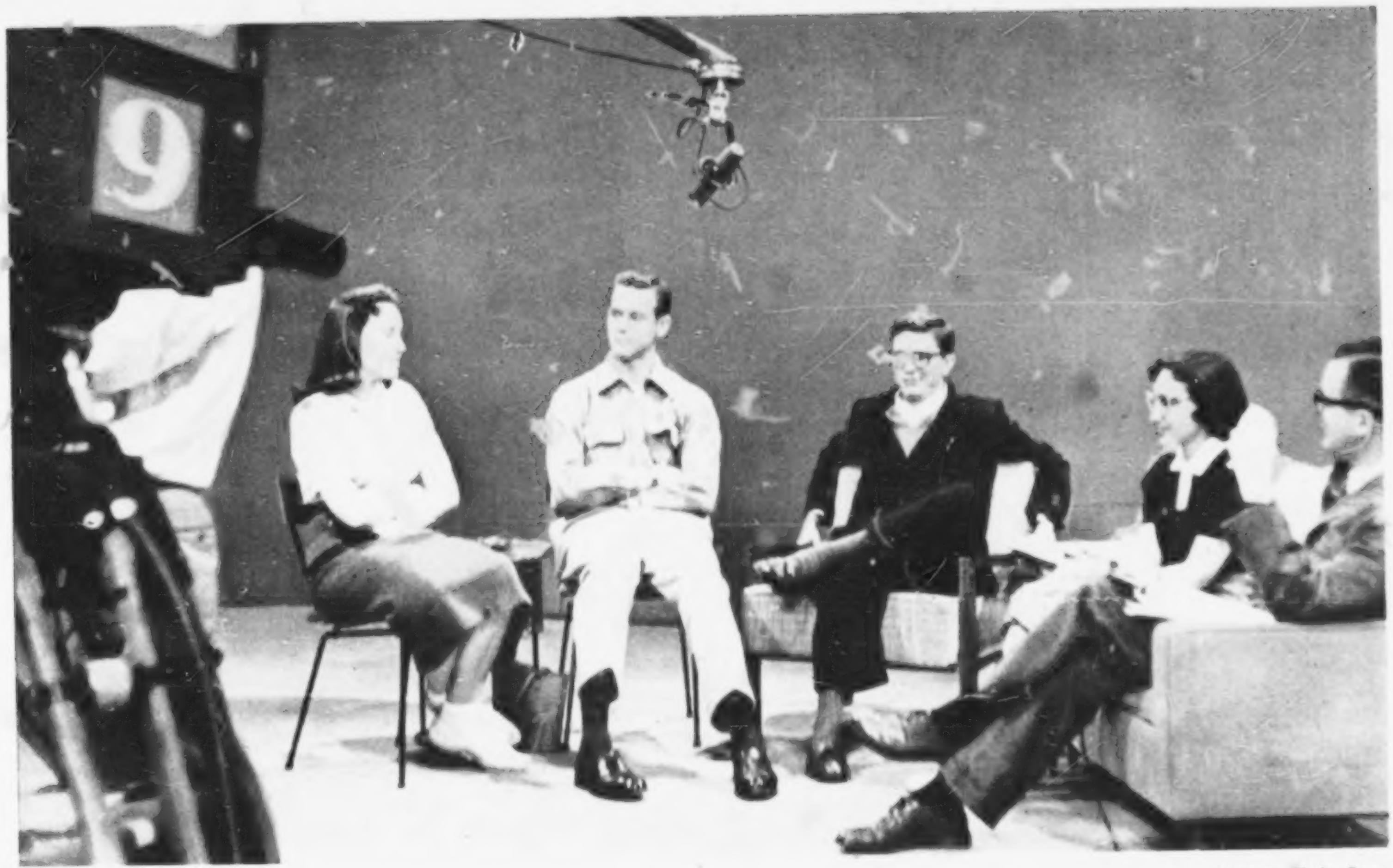
—Photo by Phebe Brown

Figure 3. The professor of the Social Science 30 course seated at his desk (behind camera), with typical charts for the course in the center-right background, and a picture of the national capitol on the rear-projection screen at extreme left background.

Social Science 30

The American Economy telecourse resembled more closely than any of the other courses the classroom lecture approach, with a heavy use of especially prepared visual materials. These included many charts and graphs, slides and motion pictures used with a rear-projection technique for presentation on a screen within the set, and illustrative "cut-outs" and summary data presented on a flannel board. (See Figure 3). Limited use was made of student actors as "living props" depicting consumer-buying situations, labor-management conflict, etc. However, these provided primarily a background setting for certain topics and characteristically involved no interaction between the professor and the actors, nor any planned lines or script for the actors to speak. The major focus of this course, then, was on the professor and his lecture material.

The budget for this project included funds for a total of six kinescopes during the year. In the case of this course, one complete broadcast was kinescoped prior to the beginning of the semester. On the basis of this kinescope, funds were provided by the Educational Television and Radio Center at Ann Arbor, Michigan, to kinescope The American Economy course in its entirety. This introduced not only the entire kinescoping process, but also involved special timing complications to allow editing for national distribution.

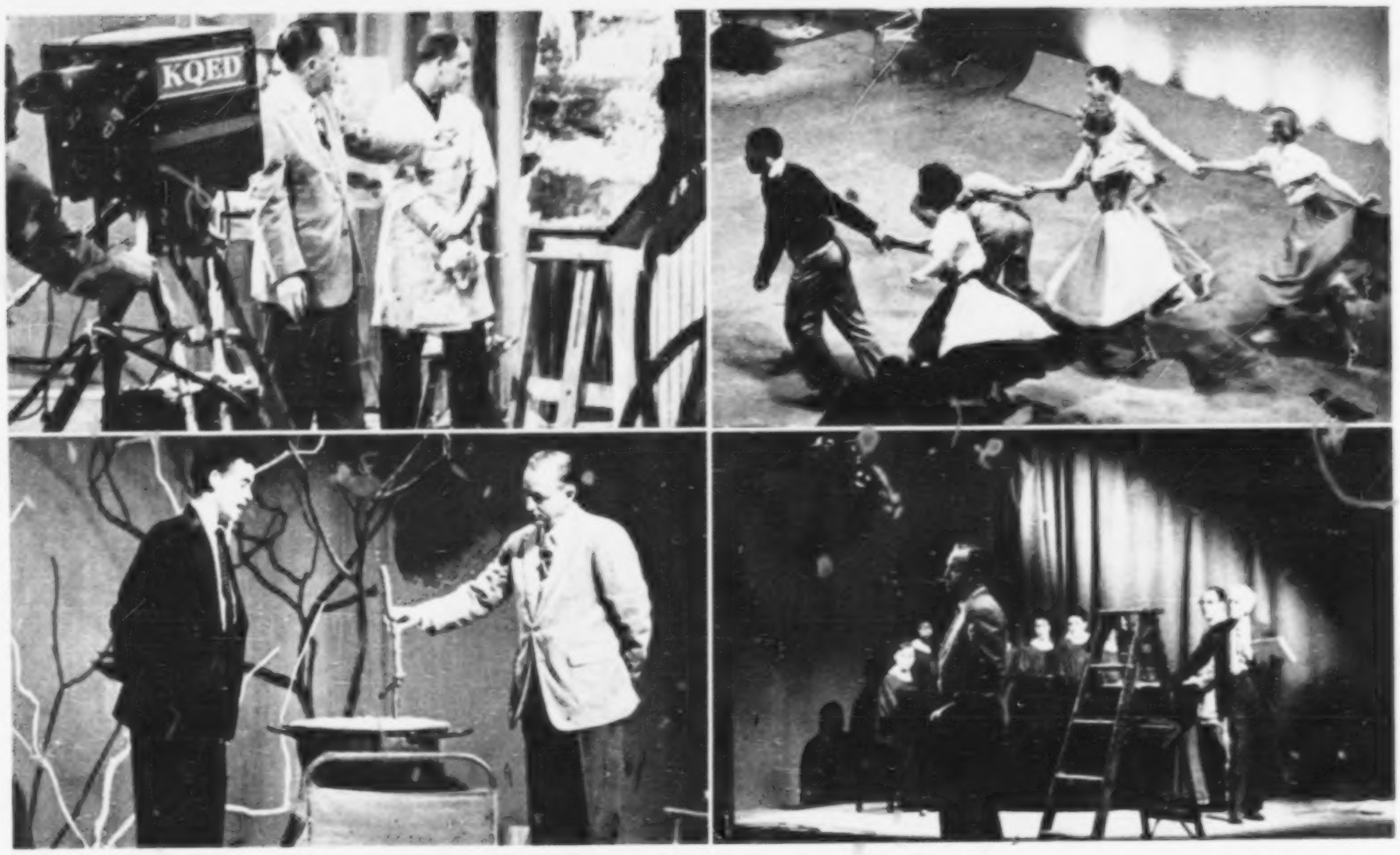


—Photo by Phebe Brown

Figure 4. The Basic Communication professor (extreme right) and a student panel.

English 6.1

The professor of the Basic Communication course made extensive use of a panel discussion approach. The panelists were students from the various sections of the course, professors from the Language Arts Division, or a combination of student and faculty participants. (See Figure 4). One other distinctive feature of the course was the guest appearance of the authors of a number of the reading materials for the course. Special visual materials, such as charts, were used to accompany the "straight lecture" aspects of the course and several dramatizations of episodes from the assigned readings were effectively used. However, the "heart" of this course lay in the spontaneous comments and discussions of panelists as they considered readings assigned for the coure or student writings presented during the broadcast.



—Photo by Phebe Brown

Figure 5. Upper left: The professor discusses a painting with a student artist. Upper right: A group of student dancers in one of the dance numbers presented. Lower left: The drama professor (to the left of the bubbling caldron) discusses with the course moderator some of the dramatic qualities of the witches' scene from Macbeth. Lower right: Behind the course moderator are a student vocal group, their director, and the professor of dance (extreme right).

Creative Arts 10

Selected from the General Education courses as one that would be a "natural" for television, this course did offer the greatest variety of interesting production possibilities of the four experimental courses. Something of the variety of the materials presented is shown in Figure 5. As given on campus, this course is a laboratory exploration of the four fields of music, art, drama, and dance. For the television broadcasts, the camera explored a broad selection of products from the four fields. In addition to student performers in all areas, a number of local and nationally known artists were interviewed or performed on the broadcasts.

Some of the broadcasts were based upon a single aesthetic concept, with examples of its manifestation in each of the arts. Other broadcasts were devoted to a more detailed look at one of the arts, with the professor from that area making the presentation. General design principles were explored in natural objects and such everyday objects as furniture, as well as in a variety of art works. While the bulk of these broadcasts involved "live" presentations, some excellent material available on film was also used. Because of the very nature of this course, the production techniques used were more like those of commercial television than in any of the other experimental courses. The production demands were heavy indeed, but the staff for the course felt that the breadth of exploration of the arts provided in this series of broadcasts was considerably greater than was characteristic of a typical campus presentation of the class.

Evaluation of the Telecourses

Student Reactions to Taking the Telecourses at Home

Since the original emphasis of this study was upon the effectiveness of broadcast telecourses taken by regular college students in their homes, plans were made to gather some general information from students about their "home classroom" experiences. To this end, a brief check sheet was prepared for students to complete at the end of a broadcast. This check sheet is given in Appendix E. The first three items were concerned with the general listening situation during the broadcast: the adequacy of the television reception, the presence of others, and interruptions. A fourth item asked the student to comment upon aspects of the broadcast which he found especially effective or ineffective; and a fifth item called for the student's general reaction to the telecourse.

Initially, consideration was given to requesting students in the At-Home TV groups to complete one of these forms after each broadcast. It was felt that such a procedure would not only provide full information about the home listening situation, but might also indicate any changes in student attitude toward the telecourses as the semester progressed. However, concern was expressed, especially by members of the Advisory Committee at their initial meeting, that requiring the At-Home TV group to complete the check sheet after each broadcast might introduce a differential motivating factor for this group as compared with the other two groups. For this reason, a much more restricted use of the check sheet was made.

In each of the courses, the check sheets were used only three times during the semester. For purposes of administering the check sheets, each At-Home TV class was divided into thirds, selected randomly from the class roll. At the beginning of the semester, one-third of the At-Home TV students completed the check sheets following **four** successive broadcasts, the second one-third completed the check sheets about the middle of the semester, and toward the end of the semester the remaining one-third of each class completed four check sheets.

Student reactions to the broadcasts, as indicated on the check sheets, are summarized in Table 52. The percentages given in this table are not based upon the number of students responding, but rather upon the total number of reaction sheets returned. Admittedly, then, these data are not satistically *pure*, since a few students failed to return any of the reaction sheets, and others did not return all four of them, as requested. However, as a survey of the home listening situation, it seems justifiable to base the percentages in the table upon the total number of reaction sheets returned, recognizing the fact that the total "N" given for each class represents the reactions of most students in the class to four successive broadcasts.

Since the first three items on the check sheet pertained to the general characteristics of the home listening situation, it seems reasonable to look at the composite picture presented by all four courses in Table 52. Indeed, the responses to these items suggested considerable consistency in the conditions under which the telecourses were received. As regards television reception (Item No. 1), the television picture was reported as satisfactory or better on approximately 85% of the reaction sheets; as poor on approximately 15% of them. Audio reception was generally more satisfactory, apparently, with usually less than 10% of the responses indicating poor reception.

While the number of situations in which others were present during the broadcasts (Item No. 2) showed considerable variability, roughly one-fifth of the time someone else was present during the telecourse broadcasts. The presence of others during the broadcasts did introduce some distraction effect (Item No. 3), since something over 10% of the responses mentioned conversation as an interruption during the broadcasts. Telephone interruptions were next most frequent (somewhat under 10%) and doorbell interruptions were reported in approximately 3% to 4% of the responses. Students were asked to indicate on the reaction sheets the duration of interruptions. Although these are not given in Table 52, most interruptions were for very brief periods, typically under two minutes, with a modal duration of less than a minute.

The material given under Item No. 4 in Table 52 is very closely related to the particular production techniques used for each telecourse. Cross-course comparisons, again, are neither meaningful nor valid. Broadly, the data given in the table reflect the general style of each telecourse, as described in the previous section of this chapter.

Since students' reactions to television instruction were more representatively and systematically covered in the final course rating sheets discussed in Chapter V, only one comment seems appropriate here concerning Item No. 5 in Table 52. Except for the Creative Arts results (representing a total of only 30 responses) the percentage of extremely negative responses by students taking a telecourse at home was very small.

Reactions of the General Public

There is no way of estimating how many persons in the general public may have watched any of the experimental telecourses systematically. The times of their presentation (early and middle afternoon hours) were certainly not good broadcast hours for many listeners in the public at large. Despite this fact, the professors for the courses received letters of appreciation or telephone calls from a number of people who were regular listeners to the broadcasts.

A matter of some concern prior to the beginning of the series was the possibility of public disapproval of some of the subject-matter to be presented. This seemed especially likely if a listener tuned in late or heard material out of its total context. In this regard, the experience with the present four courses should help future television professors over the "psychological barrier" mentioned earlier. Within the writers' knowledge only one "crank" call from the general public was received by the College during the entire year of broadcasts. The experience of those in the Chicago City Junior College experiment tends to corroborate this observation. (1, p. 39).

TABLE 52

Reaction Sheets completed during the semester by At-Home TV Groups.
(Percentages below are based upon the total number of Reaction Sheets returned).

	Economics (N = 129) %	Psychology (N = 219) %	Basic Communications (N = 107) %	Creative Arts (N = 30) %
1. Reception				
a) Visual				
Good	60	50	59	50
Satisfactory	25	32	26	37
Poor	15	18	15	13
b) Auditory				
Good	72	60	67	67
Satisfactory	21	34	24	20
Poor	7	6	9	13
2. Others Present				
Not watching	19	12	25	7
Watching	15	22	26	10
Watching for credit	2	6	15	3
3. Interruptions				
Conversation	15	9	12	13
Telephone	16	9	8	3
Doorbell	3	4	2	10
Children	6	3	0	0
Other	1	3	0	3
4. Effective				
a) Material				
Content	30	11	15	17
Student Participation	0	3	9	0
Panels	0	3	7	0
Guest	0	0	8	3
Production				
Skits	10	19	7	10
Visual Aids	2	35	8	23
Films	0	23	2	13
Dancing	0	0	0	17
Ineffective				
a) Material				
Content	18	2	8	7
Student Participation	0	2	0	0
Guests	0	0	1	0
b) Production				
Skits	14	1	0	0
Visual Aids	5	1	11	10
Films	0	2	0	0
5. General Reaction				
Dislike TV very much	8	1	0	27
Don't like TV as well	27	14	9	27
TV is satisfactory	39	33	51	7
Prefer TV to classroom	15	20	27	27
Extremely enthusiastic about TV	11	32	13	12

National Recognition

Kinescope recordings of the two fall semester courses were submitted to the Institute for Education by Radio-Television at The Ohio State University before its meetings in the spring of 1957. Both of them received awards in the Institute's annual competition. The American Economy received a "first award in the network classification for a program of systematic instruction," and Psychology 10.1 was awarded an "honorable mention in the local and regional classification for a program of systematic instruction."

REFERENCE

1. Erickson, Clifford G. & Chausow, Hymen M. *The Chicago City Junior College experiment in offering courses for credit via open circuit television.* Chicago, Ill. Chicago City Junior College, March, 1958.

PART THREE

X. Implications of the San Francisco State College Television Research Project for Higher Education

J. Paul Leonard[1]

At no other time in the United States has higher education been under such pressure: 1)the pressure of sheer numbers who desire education beyond the secondary school; 2) the pressure to maintain standards commensurate with a high quality of academic achievement; 3) the pressure of public opinion for proper education for superior students; 4) the competitive pressure in recruiting and retaining an adequate teaching staff of superior quality; and 5) the pressure for adequate funds to house and teach youth. The American people have great confidence in education, but the profession has the duty to seek ways and means to educate youth both efficiently and economically.

Faculty have for many years been wedded to the idea of small classes, to lectures and discussion as prevailing methods, to a low ratio of students to faculty, and to belief in the essentiality of personal contacts between students and teachers. These convictions have been based upon personal opinions, unsubstantiated in most instances by experimental research. Research into effective methods has been unsatisfactory to be sure, but studies which have been made give small support for many claims which have been made by teachers.

Every professional worker is familiar with the story of teacher shortage. Data on this need not be introduced here. Obviously, therefore, unless some means are found to educate the large number of youth seeking admission to college, either the number must be reduced, some new devices must be discovered, or a large number of our youth will receive inferior instruction from incompetent teachers.

Experimentation is going forward on many fronts, as is proper, to discover ways to handle students more efficiently or to teach more students without loss in quality. Television as a medium of education has come into the home in recent years, primarily through commercial channels designed by business and industry to educate potential customers on the merits of special products. Its wide acceptance has created an enormous industry of manufacturers, program producers, technicians, and experts of all kinds. Only recently has the idea been current that the medium of television could be used to educate youth in traditional academic subjects. In order, therefore, to determine whether the medium possessed values for these phases of education, experiments have been conducted in many school systems in a number of colleges and universities.

Nature of Studies on Television Instruction

Several concerns were basic to these investigations. Would television enhance learning by introducing experiences to the learner which could not be used normally in the regular classroom situation? There has not been much argument about this question. Most teachers agree that television can do this as audio-visual aids of many kinds have done for years. While the use of television for this purpose may improve learning, it does not serve to meet the problem of teacher shortage. In addition, its use in this manner adds to the present cost of education.

A second question has to do with whether students can be grouped into normal classes and observe by television a professor either teaching a class or giving a lecture or a demonstration from a studio, and by this process learn as well or better than they would if the professor appeared personally before each class. This procedure is commonly known as closed circuit television. In most instances where proper attention has been given to assisting the teacher and to monitoring the students, those who take a course by television do about as well as those who take the course from the teacher who is present in the classroom. This use of television will assist in meeting the teacher shortage by making available the work of a single teacher to a larger number of students than he would normally teach.

The San Francisco State College experiment was designed to go one step further than the investigations of the effectiveness of closed circuit television. This experiment sought to discover whether students could pursue successfully regular college courses by television beamed into their homes (open circuit) by teachers doing their teaching from a studio. If students could learn as effectively this way as they now learn in regular classes in school, then both the teacher shortage would be aided and the mounting costs for physical facilities could be arrested. In addition, a bonus would be gained by the education of all adults who desired to listen, and college education could be somewhat accelerated by making the courses available to superior high school students who could gain advanced college credits while still in high school.

An experiment of this kind has many variable factors which cannot be controlled, and doubtless some gains and losses may occur which cannot be measured adequately in any of the experimental or control groups. But these gains and losses are not measured either in normal classroom situations, and one is not justified in carrying over his opinions from traditional practice to criticise the experimental results. No one knows, for instance, what values result from the daily appearance of a teacher in person before his class. These values likely vary among different teachers. The success of this experiment and the conclusions drawn from it must rest upon those gains or losses which can be measured in the normal classroom situation and upon which normal credits, grades, and awards are usually made.

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[1] Dr. Leonard, former President of San Francisco State College, is now President of The American University, Beirut, Lebanon.

Neither is it fair to introduce for conclusions measures to test gains which obviously could not accrue from both methods, such as measures to determine whether students who took a course at home knew personally as many students as those who met daily in the same class. Probably, we have erred in teaching in expecting all classes to contribute gains in all traits which represent the sum total of values to be gained by a college education. Discussions, personal contacts, demonstrations, or lectures may not be essential in all classes. Furthermore while a few objectives may not be gained as well by those taking courses by television, these objectives may be shifted to other courses where they are possible of achievement. Objectives which must be left to small classes with close personal contacts, such as developing skills in discussion, trying one's mind against that of the professor in problem situations, and gaining values from personal contacts with other students may be achieved by aiming for these in special courses organized to make such achievement possible.

Results of the Experiment

The results of the study are of special interest for the use of educational television for "at home" teaching. Comparisons of achievement shows that generally students who took the course at home by television achieved as well in general knowledge as those who took the courses in regular classes at the college. The results for the closed circuit section are probably of less importance since there are ample data elsewhere on this question. The significant thing about the study is that the general knowledge gained, which was the primary objective of the courses taught, was as great for those who took the course sitting at home in front of a television as it was for those who attended regular classes with the professor.

This finding is more significant when it is realized that the professor who worked hard to organize his course for effective teaching on television and who spent more than normal time in preparing for his course with much more assistance than he was normally given also taught the control section. He could not in one situation be a superior television teacher and in another section with the same lesson do less superior work before the class. In other words, both classes — control and experimental — gained by having a teacher who had given more extended preparation to his teaching than he normally gave to his classes. To this extent, then, the experiment did not measure normal classroom teaching versus teaching before television with special preparation and assistance. In other words, he did not plan to do superior teaching on television and mediocre teaching in the classroom.

Sociometric measures obviously showed more association among students in regular classes, and these were significant in psychology which stressed this value, but no significant differences were clear in self-insight and acceptance of self. In attitudes toward television students varied by course. In all courses the number in the At-Home TV groups who actually disliked it was very low. While students generally indicated they preferred to take regular classes at school to TV courses, yet it is apparent that those students who participated in the at-home TV courses were much more willing to take another TV course than those who had not had the experience. It is interesting to note also that these preferences and their lack of association with other students did not affect their achievement on the knowledge tests. When it came to critical comments about the courses, the responses were highly varied and individualistic. The only consistent difference seemed to be that students in At-Home-TV groups felt they did not have enough personal contact with the instructor. In general the student attitude of the At-Home TV group who had been taught this way was more favorable to this method of teaching than any of the other groups who had not had such an experience.

In summary, then, we can say that the knowledge and intellectual growth of the students who took the courses by regular classroom procedures in normal size classes with the professor present showed no significant gain in learning over those who took the course at home by TV. Thus the quality of knowledge and intellectual growth, which were the primary purposes of the course, did not suffer by the use of open circuit television. Attitudes and association varied, but these seemed not to affect the primary learnings.

Obviously these results might vary from time to time and from place to place under different circumstances, but they are consistent with results gained elsewhere from experiments with open and closed circuit experiments. It appears from the mounting accumulation of evidence that there is no loss in the present quality of instruction when students take courses by television rather than by regular classrooms. Further study needs to be made on a greater variety of courses to determine in what fields differences begin to show. If one wishes to act upon the results already obtainable from this and other studies, much saving can be made in faculty and facilities.

Professors' attitudes toward television are more discouraging than those of students. Nervous tension, concern about doing a good job and about being seen by everyone who desires to listen, pressure of time on the air, being less relaxed than in the classroom, and inability to get a reaction from the class to his presentation were indicated as "personal costs" to the professor teaching by television.

On the other hand there were satisfactions, such as the excitement of experimentation; favorable comments from colleagues, students, and the general public; assistance in preparation of presentations, and the feeling that the telecourse was better than the normal course taught. In general, professors did not want to teach by television exclusively or every year. Each professor was credited with half his teaching load to enable him to prepare his course the semester preceding his teaching. All but one thought more preparation time was necessary. These judgments are difficult to justify in view of a normal 12 unit teaching load and the assistance given for aid in course preparation and production assistance, except in terms of the newness of the medium and the desire for greater perfection when the course is "open to the public". One might surmise if all courses were "open to the public" teaching might be superior to what it now is when the teacher has a captive student audience. The same reactions were given regarding credit time for teaching the course. Here again the credit desired ranged from half time to full time for teaching the course. These requests seem unreasonable on the part of a professor teaching in his field of specialization. They doubtless would be reduced with more experience.

Importance of Television to Instruction

One could wish that the results of the experiment were conclusive enough to justify or repudiate without doubt the effectiveness of television as a medium of instruction in higher education. But like most initial research, this experiment, together with the results of similar investigations, serves primarily to point the general direction. This study and others have in the main shown rather convincingly, so far as the objectives of acquiring knowledge and intellectual growth are concerned, that students learn as well through television classes as through normal classroom teaching. If this be true, and since times are **not** normal, the decision to use television should be made in terms of its potentialities for the immediate future. Unless enrollment in colleges and universities is greatly curtailed, educational institutions will not in the near future be able to continue to staff their classes with professors of the same capacities and qualifications as those they now engage. The question then resolves itself into one of a choice of alternatives.

The quality of instruction depends more upon the competence of the teacher than upon any other one factor except student ability. If the competence of the faculty degenerates, a reduction in the quality of learning is inevitable. This needs no proof, unless all of our experiences with superior and mediocre teaching are invalid. We must assume that this relationship of effective learning to effective instruction is valid.

This study and other experiments have shown that effective learning can be secured by television, and that in the process present faculty can be used to reach a much greater number of students than they are now reaching. The use of television is justified, then, even to maintain with a greater number of students at least the present standard of instruction. In other words, on a rising market of enrollment and a declining market of available faculty, television classes can be used to achieve the present quality of instruction. This, within itself, is a significant discovery. It is to be hoped that with further and more imaginative use of the instrument, gains can be made to where instruction may even become more effective with television than with the present traditional classroom procedures. There is little evidence really, to support the fact that we should be satisfied with the procedures now used to secure effective learning in the normal classroom situation.

Factors in Television Usage

Several factors must be taken into account in considering the use of television in colleges and universities. First and foremost are the attitudes of faculty toward the use of television as a teaching instrument.

By and large, undergraduate faculties, particularly in the social sciences and humanities, are reluctant to make such major changes in their teaching procedures as the use of television entails. Television changes the relationship between students and teacher, and this is probably the primary reason for resistance to the use of television. Teachers do not wish to disturb the contacts between student and teacher normally characteristic of the traditional college classroom. Teachers not only enjoy this relationship but they believe it is essential to effective learning. The physical presence of students provides a visible audience, it stimulates the teacher, it checks him on the effectiveness of his presentation, it provides an opportunity for questions and for socialization within the classroom. The absence of these factors in a television class causes many faculty to insist that these elements are essential to learning and to conclude therefore that instruction by television cannot be effective. They are, therefore, troubled by experimental studies which show that students still learn as effectively without them as students who have the traditional student-teacher contacts. Faculty even tend to doubt the validity of such experimental results and tend to maintain that there are hidden gains which cannot be adequately measured.

Further studies, therefore, need to be made, and work needs to be done to determine whether these personal contacts are essential for all classes. There is little personal contact in large lecture classes, and the habit of asking questions near the end of a lecture may be of less value than many ordinarily assume. Certainly there is little, if any, evidence to prove that such questioning contributes much to judging the effectiveness of the teacher's presentation, or makes significant contributions to teaching students how to engage in discussion.

In the second place, open circuit television changes markedly the environment of the average classroom. Typically the teacher has had a captive audience and his remarks have not been open to his colleagues or to the general public. When his lectures or demonstrations are broadcast, three things happen: First, his organization, content, and methods are open for all to see. This is an unusual and new experience for the average college teacher and one which many are not willing to accept. To the administrator this poses no particular problems, unless the teacher attracts unusual criticism by his teaching. There was, however, no suggestion at San Francisco State College that the teacher deviate from his normal presentation or discussion according to his own scholarship or opinion. The fact that there were no criticisms of faculty teaching by television by the public probably indicates that fear of such criticism is unwarranted or that there is no need for limitation of expression within the bounds of judgment and scholarship.

Secondly, there was on the part of the faculty using television much more careful preparation for teaching than the teacher had normally done, as was suggested by all participating teachers; and this was a gain for the instructional process. There was the further service of making the classroom instruction, without any additional work on the part of the teacher, available to secondary school pupils and to adults of the general public.

In the third place, teaching by television does make demands upon the teacher which are not made by regular classroom teaching. Until one becomes familiar with the medium there is bound to be more nervous tension, more demand for using techniques of expression, for clarity and effective organization, and for considerable practice to become less and less self-conscious. If the broadcast comes from a regular classroom with students (a practice this writer does not recommend), dual attention is required—to the class and to the camera. If lectures are given from the studio, much practice is necessary to become comfortable and satisfied by speaking to the green eye of a camera. Since these factors must be taken into account in introducing television for instruction, it is necessary that the administration plan to consider them.

Policies Regarding Faculty

The administrator who introduces television as a substitute for classroom teaching needs to set some policies around which faculties can make basic decisions. Such policies as the following are suggested:

1. Faculty members should not be **required** to teach by television. If faculty understand clearly that such teaching is voluntary and that they will not be penalized for choosing to continue their regular classroom schedules and have nothing to do with television, many tensions will be eased.
2. Faculty who do teach by television should have the opportunity to continue one or two regular classes and to have contacts with students. No teacher should do all of his teaching by television. This practice would prevent the feeling of being a "television teacher", something like a professional kicker on a football team. It is probably not wise to have a teacher handle more than one television class a semester.
3. Faculty who teach by television should be supported by assistants to help them prepare their visual materials, by assistants who will aid in reading papers, and by a professional television production staff. This group, working together as a friendly team, can do much to aid morale and to establish a program of "loyal criticism" of one another, all for the improvement of the instructional program.

   In building this supporting staff the administrator will need to determine the amount of aid to each teacher. The production staff will need to serve all teachers, but individual teachers will need their own readers and assistants.
4. Faculty who teach by television should receive the same consideration for advancement as those who teach regular classes.
5. Faculty who teach by television should receive more credit on their teaching load for a class taught by television than for a regular class. This arrangement is necessary and fair, since all studies show that generally those who teach the classes by television do spend a disproportionate amount of time on preparation. In addition, they do need some compensation in time for the additional tensions generated by the use of television.
6. Faculty who teach by open circuit television should not be expected to temper their teaching to public opinion, to restrain from normal and scholarly expression of opinion and facts, and should be assured by the administration (by both policy and action) of protection from outside pressure, so their freedom of teaching would not be jeopardized. This policy, followed up if necessary, by effective action to sustain it, will do much to allay the fear that many faculty have of loss of academic freedom by the use of open circuit television.

There are other policies the administration in working with the faculty may want to establish. The administrator who takes time to work with his faculty to see that certain fears are discussed and considered and that definite policies are fixed to deal with situations which concern faculty will be amply rewarded.

Objectives of Courses

Attention also needs to be given with the faculty to the problems of the present objectives of certain courses and to changes that need to be made in certain course objectives when courses are taught by television. Obviously, as stated earlier, students cannot come to know one another in a course when they do not meet together as they do in a regular class. But this objective of socialization need not be an objective of every course, for if it is the use of television is blocked at the start. Furthermore, before such an objective is accepted as valid for the course, its relation to effective learning needs to be validated. In this experiment, the lack of socialization did not seem to affect the acquisition of the primary objectives of the courses.

The same position should be taken regarding discussion, which frequently results only in student questions at the end of the lecture. Some questions are asked for clarity, which can largely be offset and anticipated by careful organization and presentation by the teacher. Some are doubtless asked to have an effect upon the teacher; some may indicate a proper lack of attention by the student. These can be ignored without loss. But by and large, such questioning contributes little, if anything, to mastery of the process of true discussion. Again, rather than making such learnings an objective of every course, these objectives can be written into specific courses, organized and chosen for reaching this particular goal. Television can then be used in those courses where socialization and the discussion of topics need not be significant.

Such a position leads then to the conclusion that the use of television should be restricted to certain courses which the students can pursue effectively, and that no attempt should be made to offer a complete college education by television. The complete objectives of a college education are too varied to be secured by any one method, and they are too important to be neglected or geared only to the use of any one method, no matter how valuable or economical it may be.

Production Staff

Effective teaching by television is hardly possible without an adequate and well trained production staff. This staff should offer to the professor two kinds of assistance. One is the preparation and use of visual aids. Experience has shown that ordinary materials, visible at close range, generally lose their effectiveness when shown on the television screen; colors are distorted; small type fails to carry meaning; and proportions unless carefully planned are lost. In the section in this report on the use of visual materials much valuable experience is reported, but the significant point to stress here for the administrator is that he must be prepared to have available for the teacher a minimum staff to advise on the use of visual materials and to prepare for the teacher those which he needs to make his presentation effective.

The second type of assistance is that of a television production man who can assist the teacher in his television appearance. Not everyone can make effective television presentations, but those who can will be greatly improved by proper direction from a person skilled in the art of television appearance. This position must be provided by the administration. The one who fills it must have a "feel" for the educational purpose of the presentation and must be one who places this purpose primary and ahead of tricks or acting or entertainment.

Television and Teacher Shortage

Finally, one comes to the question of the relation of educational television to the scarcity of teachers. If television is to be used, both open circuit and closed circuit can be of equal value here, but open circuit has the additional values of reaching at the same time a larger number of the general public (even high school students) than can be reached by closed circuit television. The possible savings in teaching staff will depend upon the number of students who take the course. Obviously no teacher time is saved in the use of television with single section courses; and conversely, the greatest saving is made the larger the number of sections involved. In addition, proper programming could result in better utilization of physical facilities.

The use of television as an instrument of instruction in higher education should be studied carefully by administrators, especially during the years ahead when standards are likely to be lowered, unless ways are found to make greater use of experienced and skillful teachers. This study is valuable in answering some questions, and it is hoped it will stimulate the wise use of television as an instrument of value to higher education.

Appendix A

General Education Courses at San Francisco State

Personal Development and Vocational Orientation (Psychology 10.1 and 10.2)	6 units
Communications (English 6.1 and 6.2)	5 units[1]
Natural Sciences and Health (Biology 1; Physical Science 34; Mathematics 30)	10 units
Social and Economic World (Social Sciences 10, 20, 30, 40)	12 units
Humanities (Values) (Humanities 30 and 31)	5 units
Home and Family Relations (Psychology 142)	2 units
Creative Arts (Creative Arts 10)	2 units
Physical Education and Recreation (P.E. 1.1 and 1.2; P.E. electives; Recreation 1; Recreation electives)	3 units[1]

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[1] During the past year, one unit of credit required in Recreation was dropped from the program. After very careful consideration had been given to the requests of all areas desiring more time in the program, the unit was assigned to Communications, increasing to six units the requirements in this area.

Appendix B

PROSPECTUS: EXPERIMENTAL STUDY OF EDUCATIONAL TELEVISION

SAN FRANCISCO STATE COLLEGE

December 1, 1955

I. General Statement

Those most closely concerned with the nation's educational program are devoting increasing time and attention to the problems posed by the on-coming rush of students. This has been, and continues to be, a matter of vital concern at all levels of the American educational system.[1]

While these pressures already are being felt in the elementary and high schools, their real impact is just beginning to reach institutions of higher education. In this respect, the colleges and universities of the nation are fortunate in having a period, even though a very brief one, to devote to conscientious study and experimentation in an attempt to find some of the answers to the problem.

Is educational television one of these? Can it be used effectively as a teaching tool at the undergraduate level? If so, what demands are placed upon the instructor and the institution? What contribution can it make to faculty and building shortage?

Educational television already has taken on some of the aspects of mass education. To date more than 12,000 students have enrolled in some 170 regular academic television courses, mostly adult education, given by 44 different institutions.[2] In addition, approximately ten million people have viewed educational programs for no regular credit. In light of this unprecedented development, it is obvious that television has become a major force in education.

San Francisco State College believes that educational television has possibilities which need to be explored and evaluated critically to determine what place, if any, the medium can play in alleviating the great demands upon faculty and facilities in institutions of higher education. Significantly, the proposed project involves regular academic work for stay-at-home students, an area in which the medium can make its most meaningful contribution to the impending shortage of staff and facilities. With this in mind, the college is eager to undertake an intensive and critical study based upon an experimental project involving four undergraduate courses in general education.

II. The Proposed Project

A two-year program in general education, primarily lower division, provides the basis for all courses of study at San Francisco State College. All students regardless of intended major are required to take at least 45 hours in this program, divided among the social sciences, natural sciences, humanities and language arts. To make certain the program is general education in fact as well as in theory, courses are specially designed, follow closely defined educational objectives, and cannot be counted toward major requirements. This program represents eight years of careful work by a large segment of the faculty of the college.

Enrollment in the college for the fall term 1955 totals 8,035 students, the maximum which can be accommodated with existing facilities and staff. New admissions were cut off in August and present facilities are in almost constant use from eight o'clock in the morning until ten o'clock at night. Even so it has been necessary to deny admission to a large number of qualified students and to require a considerable group to postpone meeting the general education requirement because sufficient sections could not be arranged.

With this background, San Francisco State College for the past two years has been considering experimenting with television to determine if it can become a means of alleviating the crowded conditions. An intensive and careful planning study has been made by a committee representative of the faculty generally and the experimental project suggested herein is an outgrowth of that study.

The committee has posed two major questions to be considered in this experiment. They are: (1) For what educational goals, both individual and social, can television be used? and (2) What problems does a college face in the use of television toward the realization of these goals?

With these two unanswered questions paramount, the college respectfully proposes the following outline as a guide for a one-year experimental project.

Content

The experiment would involve four one-semester courses in general education, one each in the areas of social science, language arts, psychology, and creative arts. Television sections of two of the courses would be scheduled during the fall and the other two during the spring semester. The actual courses which it is proposed to teach by television are as follows:

1. Social Science 30—Contemporary Economic Society (3 hours credit)
2. Psychology 10.1—Personal, Social and Occupational Development (3 hours credit)
3. Creative Arts 10—Creative Arts Exploration (2 hours credit)
4. English 6.1—Basic Communication (2½ hours credit)

These courses were selected not only because they play an important part in the general education program of the college, but also because it is anticipated they will present varying degrees of difficulty in presentation by television. It is expected, for example, that it will be relatively easier to make use of the visual aspects of the medium in Creative Arts 10 than in English 6.1.

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[1] Teachers for Tomorrow, Fund for Advancement of Education, Bulletin No. 2, November, 1955.

[2] American Council on Education, Committee on Television, June 22, 1955.

EXPERIMENTAL PATTERN

STUDY OF TEACHING BY TELEVISION

SAN FRANCISCO STATE COLLEGE

December 1, 1955

Group I Television Section	Group II Campus Section	Group III Campus Section
1. No. of students: 90	1. No. of students: 45	1. No. of students: 45
2. Instructor A	2. Instructor A	2. Instructor B
3. Same course objectives	3. Same course objectives	3. Same course objectives
4. Same course topics and text	4. Same course topics and text	4. Same course topics and tests
5. Supplemental library readings	5. Supplementary library readings	5. Supplemental library readings
6. Same tests	6. Same tests	6. Same tests
7. Comparable aptitude and ed. background span among students.	7. Comparable aptitude and ed. background span among students	7. Comparable aptitude and ed. background span among students.
8. On-campus discussion section every two weeks (two groups of 45 each)	8. Regular discussion as part of class	8. Regular discussion as part of class
9. Studio presentation	9. Classroom lecture	9. Classroom lecture
10. TV method of presentation — heavy on audio and visual aids.	10. Some visual aids	10. Some visual aids

The proposed experimental pattern is shown on the accompanying chart. In brief, the proposal is to keep the basic subject matter of all courses, for both experimental and control groups, the same with all students having access to the same source materials. Television sections will be planned carefully to achieve the same objectives as the regular classroom courses. However, each of the television sections will be designed to take full advantage of the medium through use of visual aids and other supplementary materials.

The faculty planning committee is of the opinion that utilizing visual advantages of the medium is of paramount importance to the study and constitutes a field of experimentation which has not adequately been covered in other projects. Dr. Huston Smith, associate professor of philosophy at Washington University, confirms the need for this approach in comments on his experiences in teaching by television. Dr. Smith has said:

> "Converting a good classroom course to a good television course is not a matter of shifting it intact from a classroom to a studio. It is like crumpling up a jig-saw puzzle whose pieces can be fitted together in more than one way and figuring out the new and untried way they must be assembled."[3]

Time

The total project period, as planned, would run from the spring semester of 1956 through the summer of 1957. The teaching experiment itself would be carried on during the 1956-57 academic year with two courses being scheduled for the fall semester and two for spring. However, since establishing a sound procedural base is considered of critical importance to the validity of any experiment of this kind, it is proposed to utilize part of the spring and summer of 1956 for this purpose.

The preparation period would provide for the selection of a committee of consultants, knowledgeable in the field of communications and representative of the disciplines involved, the establishment of procedural techniques, selection and grouping of students, selection and training of teachers, preparation of course materials and pre-test and evaluation activities. Analysis and preparation of a final report would extend into the summer of 1957.

Proposed Procedures

The proposed study will use a form of the experimental-control group technique as its basic design. This method will involve one group of students who will receive most of their instruction by television and two control groups, each of whom will receive instruction in the conventional sense in the same subject on the campus.

Inclusion of two control sections is recommended to provide a second point of reference for comparison purposes and thus to help insure validity of results. One of the two campus classes will be taught by the same instructor who handles the television section. The other will be taught by a different instructor. The committee feels that such a pattern may provide some interesting data on whether the experience of teaching by television tends to improve classroom techniques as has been claimed by some instructors who have used the medium.

An attempt will be made to enroll approximately 90 students in each of the television sections and a total of 90 in the two control groups. Students enrolled in the television sections will receive most of their instruction individually at home via television. An On-Campus "laboratory" session will be scheduled every two weeks to provide an opportunity for discussion and individual attention and also to permit a constant evaluation of results. The television group will be divided into two sections of 45 each for the discussion meetings. The proposed class periods for the four television sections are as follows:

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[3] From an address prepared for delivery October 7, 1955.

	Minutes Per Period	Periods Per Week	On-Campus Discussion
1. Social Science 30	45	2	2 hrs. every other week
2. Psychology 10.1	45	2	2 hrs. every other week
3. Creative Arts 10	45	2	2 hrs. every other week
4. English 6.1	45	2	2 hrs. every other week

Every attempt will be made to match student groups in terms of learning aptitudes, educational background and other factors relative to the learning situation.[4] It is hoped to keep motivation for all groups as normal as possible, chiefly through the selection of teachers who will be objective in handling various aspects of the assignment. In addition, careful pre-testing and personal interviews with all of the students are planned with enrollment in the television section to be limited insofar as possible, on the basis of assignment rather than as a voluntary matter.

A comprehensive testing and evaluation program also will be a continuous aspect of the study. Detailed records will be kept of the amount and type of supervision given each of the groups, attitudinal changes as evidenced in the discussion groups and test results, both formal and informal. These data will form the basis for comparative evaluations with pre-tests and final examinations.

In addition, there will be case study material developed on both the teaching and student personnel and analytical studies will be made of costs, utilization of instructional materials and related problems. It is hoped that qualified doctoral candidates from nearby universities can be interested in developing specific aspects of the program as doctoral dissertations.

Selection of Teachers

Teachers for the television section will be selected on the basis of (1) superior teaching ability, (2) interest in demonstration, (3) experience and, (4) actual tests before television cameras. San Francisco State is fortunate in this respect in having on its staff a number of teachers who already have had experience with the television medium.

Areas of Exploration

While specific questions to be studied will be worked out in cooperation with the consulting committee, in general it is proposed that the experiment seek data in the following areas:

Can courses in lower division college work televised to students at home achieve the same goals and objectives as the same courses given on campus?

a. Is the learning of these home-viewers comparable to that of those students who take the courses at the college? If so, is there any difference in students of different aptitudes and educational backgrounds as compared with their equals in regular classroom work?

b. What motivational influences begin to show up in prolonged periods of television instruction?

c. What kinds of experiences, assignments, methods and materials of an audio and visual nature need to be developed in lieu of direct contact between instructors and students in the classroom?

What major problems does a college face if instruction by television is to be educationally sound?

a. In terms of faculty.
   1. What demands are made on an instructor who televises courses in terms of tension, quality of organization and presentation of materials, etc? What changes take place in these factors as the instructor gains experience in television?
   2. What is a reasonable faculty load for the instructor who televises courses?
   3. What assistance, both in the on-campus discussions and in the television studies, needs to be provided to the instructor involved in this program over and above that allocated for regular classroom teaching?

b. In terms of institutional planning.
   1. If it does appear that certain courses can be adaptted to teaching by television, to what extent does this require changes in the over-all general education program?
   2. Are there differences in the various fields insofar as adaptation to the television medium is concerned?
   3. What would be the effects of such televised teaching on faculty staffing, assistant allocation (clerical and technical), instructional expense, and building needs?

III. Use of KQED Facilities

San Francisco State College has been assured the full use of all facilities of the Bay Area Educational Television Station, KQED. Experienced personnel of the station, including directors, producers, writers, staging experts, etc., will be made available, in so far as possible, to the college for production assistance during the planning phases of the project as well as during the course of the experiment itself.

Assistance from the station constitutes a valuable resource which might not otherwise be available to educational institutions. Almost all of the key members of the station staff have had considerable experience handling difficult and complex educational subjects for television presentation, ranging from discussion of the principles of nuclear energy by Dr. Edward Teller to a survey by Dr. John Dodds of the literary treatment of the various types of loyalties imposed upon man.

In addition, the college also has a highly trained staff of its own in the production of television programs and audio-visual materials. The head of its audio-visual department has had many years of commercial motion picture production experience, one member of the television staff has produced between 200 and 300 commercial shows and the other has just come to the college from NBC in Chicago where he directed and produced network shows originating from there. Another member of the staff has been close to the national educational television picture, having served for the past two years with the Educational Television and Radio Center in Ann Arbor, Michigan.

IV. Planning and Pre-test Period

It is important to any experiment of this nature that the procedural base be established with care and with the advice and consultation of the best possible educational authorities in both the content and communication areas. For this reason, it is proposed to assign certain staff members half-time during the spring semester 1956 to the preparation of course syllabi, choice of materials, establishment of evaluation standards, selection and training of teachers and liaison with the consulting committee.

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[4] One of the areas in which research is most urgently needed, according to George J. Wischner and Ivan H. Scheimen (*American Psychologist*, October 10, 1955) is on the types of student for which TV is most effective, in terms of aptitude and educational background characteristics.

The preparation also will include the training of each of the instructors in television techniques and utilization by members of the college Radio-Television department and selected personnel of KQED staff. Control techniques, test procedures and sample testing also will be carried out during the preparation period.

A consulting committee of nine members is recommended. Some of these will be drawn from the faculty of the college, others from educational institutions in the Bay Area and some from throughout the nation. At the outset it also is planned to invite in for advice and consultation the heads of the departments most directly concerned with research in this area at Stanford University and the University of California. Through this means, there is a possibility that qualified doctoral candidates can be assigned to various phases of the project and to additional areas not covered by the grant. For example, it has been suggested that some interesting data might be obtained on listeners who view the programs for other than college credit or, perhaps, on a group of exceptionally bright high school youngsters who might be encouraged to view the programs, later taking examinations for advanced college credit.

V. Experiment to Complement Existing Studies

The experiment proposed by San Francisco State College is planned to supplement and complement those already being conducted at other educational institutions.[5] Careful study of the experiments in progress has been made and conflicting and over-lapping demonstrations have been eliminated except where they are considered fundamental to validity of the experiment.

Of importance to the total picture of research in educational television, the proposed study by San Francisco State College would provide data on at least four new, and significant, aspects of the use of television as a teaching device. These are as follows:

(1) Instruction will be given in four widely varying fields, at the college level, to test the relative difficulty of adapting each of these to television instruction.

(2) The proposed study will involve students receiving instruction *at home* as individuals and not as part of a listening group. Closed-circuit and other demonstrations have involved group viewing of the television group.

(3) No attempt will be made to keep the television lecture exactly the same as that given in the classroom. Rather, the television demonstration will be planned to take maximum advantage of the medium. Course objectives will remain the same and testing procedures will be comparable, but teaching techniques will be different.

(4) An attempt will be made to gather data on the effect of television teaching on the instructor through use of two campus "control" groups. The experiment may show, therefore, whether such teaching improves the classroom presentation by the instructor or detracts from it.

VI. Conclusions

The proposal outlined herein is frankly experimental in nature. It does not seek to prove anything nor to provide final answers to any problems. Rather its purpose is to determine through a series of controlled demonstrations whether or not television can be used effectively in the teaching of an undergraduate general education program and, if so, what effects would this have on the instructor and the institution.

However, in view of some of the urgent problems of staffing and the inadequacies of facilities facing institutions of higher education, the results could have far-reaching significance. For this reason it is proposed to keep careful and detailed records of all aspects of the experiment and to make available as widely as possible information on the experimental procedures as well as on the results obtained. Kinescope recordings of one entire course and tape recordings of the sound tracks of all others is proposed for evaluation and record purposes.

It should be pointed out, too, that the experiment would be conducted in the most critical area of the nation insofar as the pressures of student growth are concerned. The predicted increase in college enrollments in California for the next ten years, 230 per cent, is the highest in the country and is an indication of the magnitude of the state's problem. Budgets for the state colleges alone for next year call for more than 500 new faculty.

In its own program, San Francisco State College has reached the maximum enrollment which can be accommodated with present staff and facilities. This, along with the situation in the state generally, has served to create a climate of opinion favorable to an experiment of this kind along with the opportunity for the project to develop widespread significance and influence as well as interest throughout the state and the nation.

Finally, the amount requested as a grant represents only a part of the total costs involved. Both the college and Station KQED will make substantial contributions to the project through the time and effort of faculty members, administrative staff and the full employment of other educational resources at their respective commands.

VII. Budget

A proposed budget for the project is attached. (Summary).

Salaries and wages, teaching, evaluation and production personnel	$ 44,946.00
Operating expenses, including program materials, testing and evaluation, consulting committee, etc.	25,925.00
Station KQED for production costs, kinescoping and tape recording	52,356.00
Program for exceptional high school students, if included in project	1,950.00
Total	$125,177.00

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[5] Pennsylvania State University, Stephens College, Pittsburgh Public Schools, St. Louis Public Schools, New York University, State University of Iowa and Iowa State College.

Appendix C

PSYCHOLOGY 10.1
PERSONAL AND SOCIAL ADJUSTMENT

Course Objectives:

General: Instructors teaching Psychology 10.1 are attempting to promote the following goals or objectives:

1. An understanding of why people behave as they do, such understanding to be based on a study of emotional, interpersonal, intellectual, and physical factors.
2. The inclination to accept and the ability to use scientific methods and scientifically derived data in explaining and describing human behavior.
3. An understanding of the motivation and skills involved in educational and vocational success.
4. An understanding of some of the psychological factors underlying abnormal, deviant, and antisocial behavior.
5. An understanding of the emotional and psychological problems faced by young adults in our culture.
6. An understanding and an acceptance of the need for interdependence and mutual responsibility occasioned by living in a complex modern society.
7. An understanding of some of the personal and emotional problems caused or aggravated by life in a rapidly changing world.
8. An understanding of some of the ways that the findings and work of psychologists can be used to improve interpersonal relations, personal adjustment, and inter-group relations.
9. An awareness and an acceptance of the emotional factors underlying the behavior of oneself and others.
10. An understanding of the similarities that draw us together in common causes and an acceptance of and respect for the differences that make us individuals.

SOCIAL SCIENCE 30

Course Objectives:

Social Science 30. Contemporary Economic Society, has the two-fold aim of helping the student (1) to discharge his citizenship responsibilities more effectively by understanding the functions of the American economy and (2) to become aware of his interests, rights, and duties as a consumer and a producer.

To these ends the student is prepared so that he:

1. Has an understanding of the basic functions performed by economic systems, with particular emphasis upon the American institutional setting. (Resource allocation and conservation; production, exchange, distribution, consumption, institutions of the American economy).*
2. Is acquainted with the major forces determining employment, output and income distribution. (Causes, nature, and remedies of economic fluctuations; savings and investment; social and economic costs of unemployment; income distribution and its impact on a political democracy).
3. Has a general knowledge of the historical development and present status of American business, agriculture and labor. (The economic, political, and social role of business on the American scene; agricultural policies and programs in an industrial society; aims and structure of organized labor; collective bargaining and public policy within the framework of contemporary labor-management relations).
4. Has an appreciation of the manifold economic functions of his government, including taxation, public expenditures, and regulatory and protective operations. (The economic role of the government in a historical perspective; types and nature of taxes; regular government expenditures; compensatory fiscal policy; governmental budgets and the public debt; routine government regulation of economic activities; government protection of consumers and producers, the economic role of government in a defense economy).
5. Has the groundwork for coping with his personal economic problems. (Techniques of buying and budgeting; selling methods; advertising; fraudulent practices; insurance, investment, home-ownership, and consumer credit; consumer organizations and information).
6. Has some familiarity with other economic systems and can view them in comparison with the American economy. (Private enterprise system, authoritarian socialism, democratic socialism, fascism, and cooperation).

ENGLISH 6.1

Course Objectives:

Our focus is on the individual and his acquisition of those ideas and skills of communication that will best serve him in college and in life. The course is conceived as laying a foundation for the entire General Education program at our college. The subjects for reading, discussion, and writing are drawn from many areas in an effort to stimulate awareness of the student of his expanding world and to help him discover and enjoy his own fullest potentialities.

Since our emphasis is on individual growth, we stress the dynamic relationship between the materials of expression and the techniques that enable the student adequately and effectively to communicate. We begin in Unit I by introducing him to some of the problems involved in the establishment of successful inter-personal relations. In Unit II the student is made acquainted with the facilities provided here for his intellectual and social development, and an attempt is made to place the general education program in the context of the various statements of educational theory, both modern and traditional. The unit is conceived of as asking the question, "What is the purpose of education, and what is its importance to the life of the individual?" In Unit III the student considers the contributions of scientific, religious, and ethical thought to the life of modern man. He is encouraged in his writing to assume more personal responsibility for his own development as an individual.

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*Within the parentheses are topics in the course outline that pertain to the attainment of the respective objectives.

CREATIVE ARTS EXPLORATION (C. A. 10)

Philosophy of Creative Arts Exploration

The course was originally designed for students who had little background in any one of the four art areas—Music, Art, Drama, and Dance. The purpose of the course was to stimulate the students' interest in these four fields and through observation and participation, help them grow into an increased awareness of the four art forms as a means of self expression and personal communication.

Historical Development

1949-1952

Creative Arts Exploration was originally organized by Flavis Richards in 1949. The two units allocated to the Creative Arts Division were divided into ½ unit laboratory courses each having to do with some aspect of Music, Art, Drama, and Dance.

As our General Education program grew, it became evident that the needs of the students were not being met by the ½ unit courses, and as a result, these classes were replaced by *one* two unit course. The size of this newly organized class ran around 75 to 80 students. This class was divided into four parts, representing each of the art areas—Music, Art, Drama, and Dance. It was taught by four instructors, who, presumably had a degree of familiarity with all four fields. Because of the size of the class, the limited physical facilities, and lack of staff, it was impossible to present the class material other than on a lecture-demonstration basis.

As the size of our student body increased, it soon became apparent that an additional section of Creative Arts Exploration was needed. The original staff carried the subject presentations in both sections with Miss Richards assuming the dual responsibility of Music instructor and general coordinator. The enrollment at times in the two sections totalled approximately 200. This factor further reduced the possibility of creative teaching on anything but a semi-formal basis. Enrollment had to be taken by numbers, examinations were of the machine scored type; as a result of problems such as this, the course was evolving into the very antithesis of what the original purpose of the course had been. Substitute classes or equivalents for the two units of Creative Arts had previously been established; because of certain misunderstandings in counseling, the majority of the students seemed unaware of the equivalents. As a result each student felt CA 10 was a requirement.

Recent Developments

1952-1953

The problems outlined above persisted until the spring of 1953 at which time additional physical facilities on the New Campus made it possible for the course to be organized on a two hour laboratory basis—carrying the same unit value. The course at the present time is still under the guidance of four instructors, but the class size has been held to a reasonable minimum. Each instructor has a group of 25 students for approximately seven two hour meetings, after which time the group moves on to another subject area under the direction of another instructor.

The class members actually work with media and materials in Art; they engage in rhythmic movements in the Dance section; they compose songs in the Music group; they give vent to their latent histrionic tendencies in Drama. The group as a whole meets together frequently for special presentations. In addition to class experiences, the students are encouraged to explore the rich and varied art resources of San Francisco and the Bay Area.

Appendix D

ATTITUDE QUESTIONNAIRE

Name:
Course:
Section:

1. Indicate your general reaction to taking a college course by television.

....	....	....	....	....
Dislike it very much	Don't like it as well as on-campus classes	It is satisfactory	Prefer TV to classroom presentation	Extremely enthusiastic about it

If you care to, give reasons for your rating.

2. If a course you needed were being offered by television next semester, with which of the following groups would you sign up?

....................TV at-home
....................TV on-campus
....................Regular campus group

3. Which of the following deficiencies do you feel apply to the section of the TV project course you have just completed?

................Not enough personal contact with instructor.
................Subject matter dull.
................Too much reading
................Lack of organization in class presentation.
................Course content not important to me personally.
................Presentation too elementary.
................Too much technical material.
................Classroom situation too casual.
................Poor use of audio-visual aids.
................Content not practical—too theoretical.

Other..

The research staff for the TV Project wishes to thank you for your cooperation in providing us with all of the additional information required in evaluating this semester's experimental classes. If there are any further comments you would like to make, please use the reverse side of this sheet. Or, we should be glad to talk to you personally if you care to come to C. A. 118.

Thank you again!

Sincerely yours,
ROBERT E. DREHER
Director, Television Research Project

Appendix E

Name:
Course:
Section:
TV class on ...., 195......

Completion of the check sheet below provides an essential part of the data being collected for the TV Research Project These sheets will be picked up and used by members of the research staff only. Your answers will in no way affect your grade in the course. *Please be sure to answer each question.*

1. How was your reception today?

   Audio: good..............................satisfactory..............................poor..............................

   Visual: good..............................satisfactory..............................poor..............................

2. Were others present in the room during the broadcast? (Do not list names, but please identify others present in a general way. For example: mother, 2 adults, 1 student, 2 children (ages 7-9), etc.)

   a) Not watching the broadcast:
   b) Watching the broadcast:

   If anyone else present was taking the course for credit, please give his (or her) name:......

   ....

3. Were you interrupted during the broadcast? Yes............... No...............

   By: conversation............., telephone............., doorbell................., other (specify).......................

   ....

   Approximately how many minutes?.................

4. Indicate parts of today's broadcast that you thought were especially effective?..............................

   ....

   Ineffective? ....

5. Indicate, for this stage of the course, your general reaction to taking a college course by television.

....	....	....	....	....
Dislike it very much	Don't like it as well as on-campus classes	It is satisfactory	Prefer TV to classroom presentation	Extremely enthusiastic about it

   If you care to, give reasons for your ratings:

6. Below, or on the back of this sheet, jot down any questions you have on today's broadcast. You will have an opportunity to discuss these questions with the professor during your on-campus meetings, at the end of which your check sheets will be collected.